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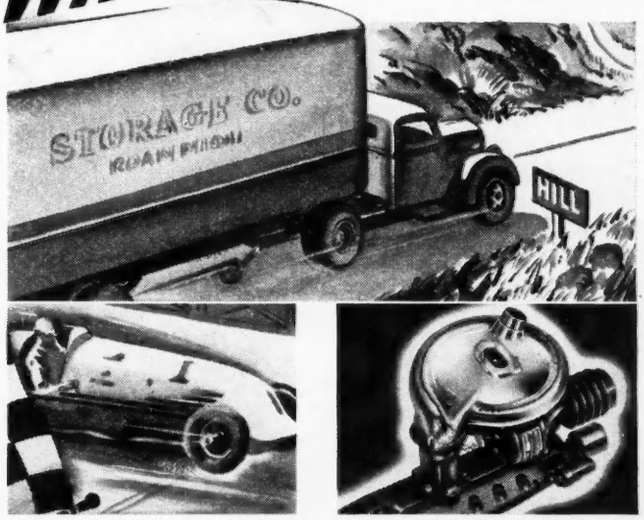

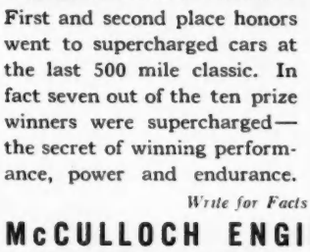

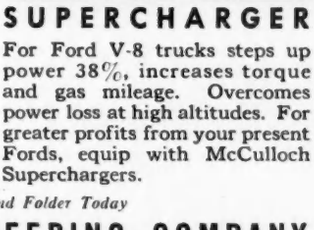

First and second place honors went to supercharged cars at the last 500 mile classic. In fact seven out of the ten prize winners were supercharged—the secret of winning performance, power and endurance.

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For Ford V-8 trucks steps up power 38%, increases torque and gas mileage. Overcomes power loss at high altitudes. For greater profits from your present Fords, equip with McCulloch Superchargers.

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FLEET OPERATOR SLASHES

A FEW OF THE 78 CHEVROLET CARS in the fleet of the Hertz Driv-Ur-Self Station, Birmingham, Ala. These passenger cars as well as 30 "Chevy" trucks are all 100% Texaco fueled and lubricated.

TEXACO

COMMERCIAL CAR JOURNAL

DECEMBER, 1939 VOL. LVIII, No. 4

FREE books

BOOKLETS
PAMPHLETS
CATALOGS

Missing from its accustomed niche for the past few months because the caliber of offerings failed to stir our editorial enthusiasm, the "Free Books" column returns with a full compliment of unusually worthwhile offers. To get a copy, just check appropriate initial at bottom of post card between pages 88 and 89 and mail to CCJ.

Sizes & Weights

Once each year it is a pleasure to call attention to that pocket size handbook on truck and trailer size and weight restrictions put out by the Four Wheel Drive Auto Co. With 56 pages and no advertising the booklet gives complete details of all state requirements. Revised as of January 1, 1940. Yours for a check opposite "A" on the post card.

House-to-House

Those interested in house-to-house delivery problems should not fail to get hold of a copy of White's new brochure which gives full details of the company's new delivery unit from the first basic idea to the finished product. A really worthwhile sales presentation. Check "B" on the post card.

1800 gal. to the load, Esso's (N. J.) new Ford-powered fuel oil tankers have Thornton four-rear-wheel drives and Heil tanks

New York's Dairyman's League just put this insulated Mack EF on a city delivery route. Folding cab doors help speed up deliveries

101 Welding Ideas

"101 Welding Ideas for Low-Cost Maintenance" is a true appraisal of a new booklet of that title just published by Lincoln Electric Co. 101 actual case studies are presented, each showing just how welding was used to cut costs. 16 pages, highly recommended. Check "C" on post card.

South Bend Lathes

The 112-page lathe catalog just published by the South Bend Lathe Co. is probably the most complete ever released. Two hundred fifty illustration show 75 different sizes and types. To those interested in the latest lathe developments, put a check alongside "D" on the post card.

Spray Painting Data

Answers to many painting and finishing problems can be found among the 104 pages of Binks Mfg. Co.'s new spray painting catalog and data book. It contains latest developments in everything from low-priced guns to complete spray painting departments. Check "E" on the post card.

Welding Electrodes

Shopmen interested in arc welding will find some useful information about all type of electrodes summed up in ready reference form in McKay's new 24-page electrode booklet. Included are joint tentative electrode specifications of the American Welding Society and the American Society for Testing Materials. Check "F" on the post card.

Oil Facts

Third edition of Reclaimo Mfg. Co.'s 32-page booklet "Oil Facts" is just off the press. There is a full discussion of various oil problems such as varnish, sludge and water content. Check "G" on the post card.

Sanding Methods

When it comes to electric sanding, polishing or sawing anything from truck bodies to hardwood floors, there's some good advice in a 25-page booklet just issued by Porter-Cable Machine Co. Check "H" on the post card.

Snow Plow

From Baker Mfg. Co. comes a new 36-page catalog describing the company's full line of snow plows and other snow-fighting equipment. To interested fleetmen a check opposite "I" on the post card brings a copy pronto.

Post Card Between Pages 88 and 89

EARS TO THE ground

Light Literature

With the ink scarcely dry on the sealed beam headlamp announcements one of our agents has discovered plans for furnishing adapters so that the sealed beam lamps can be used on several popular cars made prior to 1940.

Brake Barometer

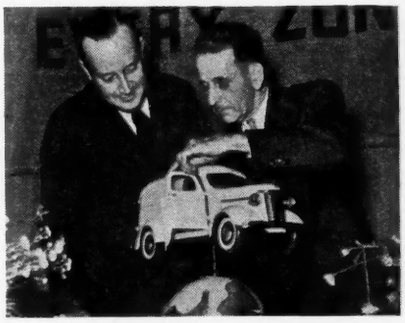
There seems to be so much experimental work to develop disk brakes going on that this department is contemplating appointing an agent in charge of that department. If this is done, his first assignment will be to get details of an electrically-operated disk brake.

Continental Capitulation

Just in passing an agent picked up the information that Continental Motors has a new four-cylinder engine of 3 3/16 in bore and 3½ in. stroke. Piston displacement is 111.7.

Axle Additive

Just to show you how simple this business of gathering news is, one of our agents sat in a meeting and heard the speaker state from the platform that a 20,000 lb. two-speed axle is being developed largely for use with diesel engines.



This scale model of a 1940 Chevrolet panel truck was presented recently to W. E. Fish (left), Chevrolet's commercial car manager, by Ross Riegle, Chevrolet metal worker, who made the model and is shown holding it

AFTER hours

EDITORIAL COMMENTS BY *George T. Hook* EDITOR

1. "We Picket the Post"—Continued . . . 2. Mr. Ickes' Gas Attack . . . 3. Regulation Versus the Golden Rule

WHEN we published our correspondence with the *Saturday Evening Post* in the October issue we promised to publish the reply of the author whose *Post* article we challenged. That reply has been received. We publish it here with the sole comment that it is not really a reply to the points we raised. It is an admission that the author did not base his scare-the-public-against-trucks statements on facts. He admits that he expressed beliefs based merely upon his own observations. Readers will wonder—as we do—why so reputable a publication as the *Post* should publish inflammatory statements against so far-flung an industry as motor trucking that were based upon some near-sighted observations made out in Berkeley, Calif.

The author's letter word for word:

Berkeley, Calif.

Dear George T. Hook:

I owe you an abject apology, which I hope you'll accept for failure to answer sooner yours of August 31, which Mr. Stout forwarded, criticizing my article, "Freight Trains on Our Highways."

I sincerely believe, from observation, that there are more "bigger and bigger" trucks on highways today than there were a few years ago, although, as you say, legislatures have limited the bigness. Smaller trucks have been replaced by larger ones which, while restricted as to size, are nevertheless larger than the simple trucks of other days.

Computing the number of highway freighters, I took the usual 20 per cent of all trucks—a figure I found in literature given me by truck operators, of whom, by the way, I interviewed 20 for every railroad source I contacted. And, you will recall, I suggested that, looking to the future, we "cut these figures in half." I still think that, cutting them in half, there will continue to be enough trucks on highways to constitute a traffic problem.

You are correct in saying I did not make clear the reference to total registrations, which figures I got from your own very accurate compilations. The paragraph should have been more explicit; I regret it wasn't—that, possibly, I relied too much on the ability of the average reader to separate specific figures from my own projections.

Finally, did you observe the "pro-truck" material in the article? Some of my railroad friends did.

All in all, I did not make up any of the basic figures I used. Most of them came from literature furnished by transport companies. My sin, it seems, was in attempting to draw unbiased information from them.

I do not believe a long distance argument will be worth while, but if you care to discuss any point specifically, I shall be glad to answer. I shall keep your letter at hand for guidance on any possible future articles on the same subject.

Respectfully
MAGNER WHITE

Hi-yo, Harold!

WE hope the industry will not take too seriously the anti-truck statement of Harold L. Ickes, who, for some peculiar reason, is a member of President Roosevelt's cabinet, and who seems to get into the newspaper headlines only when he concerns himself with matters that have nothing to do with his job as Secretary of the Interior.

Nobody else takes Harold seriously—not even New Deal Democrats. He is the Cabinet's No. 1 Crank. He is what Dickens would call an "original." Whether he is talking about the press, about so-called economic royalists, about anti-New Deal Democrats, about Republicans or about dictators, his language is intemperate—but because it happens to be colorful and because he is in the Cabinet it gets into the newspapers.

When he ranted against trucks and truck drivers at the American Automobile Association convention he didn't take the trouble to ascertain

---

CCJ QUIZ

To begin this quiz, in which you must make at least 90 to hold your place at the head of the class, we give you an example to show you how it works. The object is to pick out the name that does not belong in the list in each case. For instance:

Goodyear	Goodrich	Firestone
Lee	Delco	General

Delco would be the correct answer because it is the only one that does not make a tire. Get ready! Get set! Go!

1.	Hercules Lockheed	Buda Cummins	Waukesha Continental
2.	Gasoline Benzol	Glycerine Kerosene	Alcohol Butane
3.	Federal Fruehauf	Trailmobile Kingham	Highway Edwards
4.	Compound Series	Shunt Third Brush	King Pin Fused

facts. It was sheer ignorance that made him say trucks were getting "longer, higher and wider." (He must be a reader of *The Saturday Evening Post.*) As Secretary of the Interior he does not know what has been happening in the Interior during the last 10 years.

When he expressed a supposition that roads were built solely "for the pleasure and recreation of personal travel" he either ignored or was ignorant of historical facts in the Congressional Record. Perhaps as Secretary of the Interior he can't be bothered with such things as Commerce and National Defense.

When Harold promised himself the sadistic pleasure "of some day driving down a truck-infested road in the biggest armored tank that I can find and bumping these pests off the road" he spoke not as a member of the government who rates the term "honorable" before his name, but as a hoodlum might speak.

Harold made it clear that he doesn't like trucks. He also made it clear that he does not know what trucks mean to the economic and social welfare of the people of the United States.

In fact, the gas attack will not be as poisonous as it might have been simply because it was Harold L. Ickes who made it.

The A.A.A. and Trucks

MR. ICKES' remarks did not stampede the convention of the American Automobile Association into any anti-truck action. There was introduced a proposed model bill on limiting of truck operations over week-ends and holidays during the peak travel season, but it was referred back to the Highway and Legislative Committee.

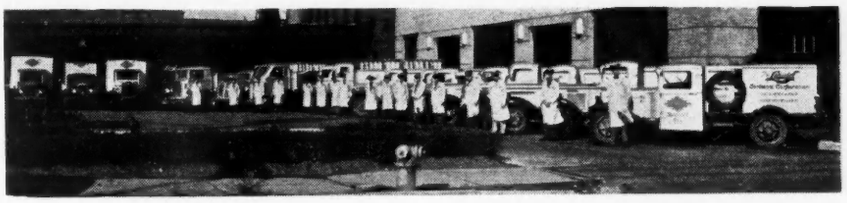
On the other hand the Association took a stand alongside that of the truck industry by sharply criticizing the "inflationary" highway cost theories advanced by the railroads.

Because of the nature of some of the proposals that have been made, it is to be assumed that the A.A.A. has in its ranks a clique that would like to play the game of the railroads and saddle motor trucks with burdensome restrictions. It is the railroad game because the restrictions would apply chiefly to over-the-road trucks. It is, of course, natural that motorists whose sympathies, whose business interests and whose destinies are tied up with railroads, should harbor an anti-truck bias. But we hope that the larger group within the A.A.A., whose interests permit them to think and act without bias, will continue to have the upper hand in matters that affect other users of the highways.

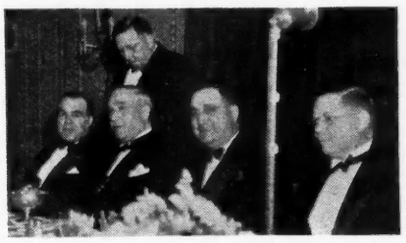
Before there is any recourse to legislation the opportunities for voluntary action should be exhausted. All three groups of highway users—private car, truck and bus—are so well organized that they should have no difficulty setting up machinery for exchanging ideas, discussing grievances and arriving at voluntary solutions or effecting compromises as collective judgment dictates. Traffic problems are generally localized, and the remedy for a local problem is not state-wide restriction; nor is national restriction the remedy for a strictly state problem.

Highway users cooperate on matters of common interest and should extend the cooperation to matters that involve each other. We doubt that there is a problem dealing with use of the highways that cannot be solved by the highway users themselves.

Why resort to regulation when the Golden Rule will serve the purpose?

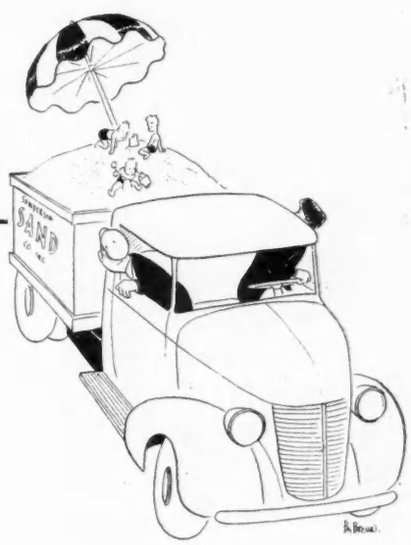


Liquid Carbonic Corp.'s Chicago branch drivers line up in honor of winning first six-month heat in a new nation-wide intra-company contest promoting greater fleet safety



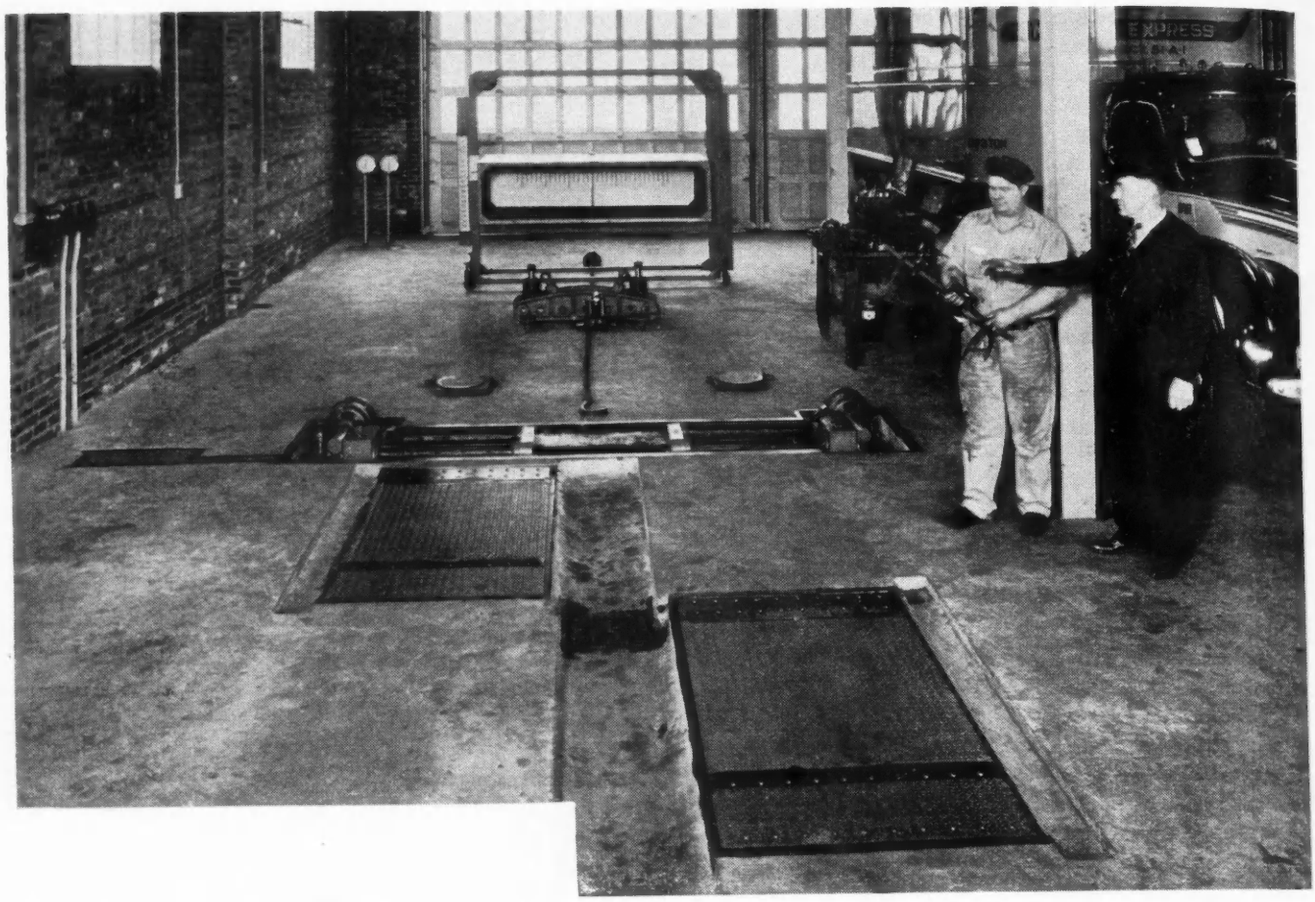
The group at annual truck show banquet includes Ted. V. Rodgers, president of ATA; Gov. Julius Heil, Wisconsin; Leo Huff, Pure Oil Co.; L. C. Allman, Fruehauf Trailer Co., J. F. Winchester, show president, standing

Oertel Brewery sent a cool wave over Louisville recently when it put a whole fleet of streamlined Autocars in service featuring refrigerated (ice cooled) bodies that keep draught beer at 36 deg. An open compartment takes empties without disturbing load

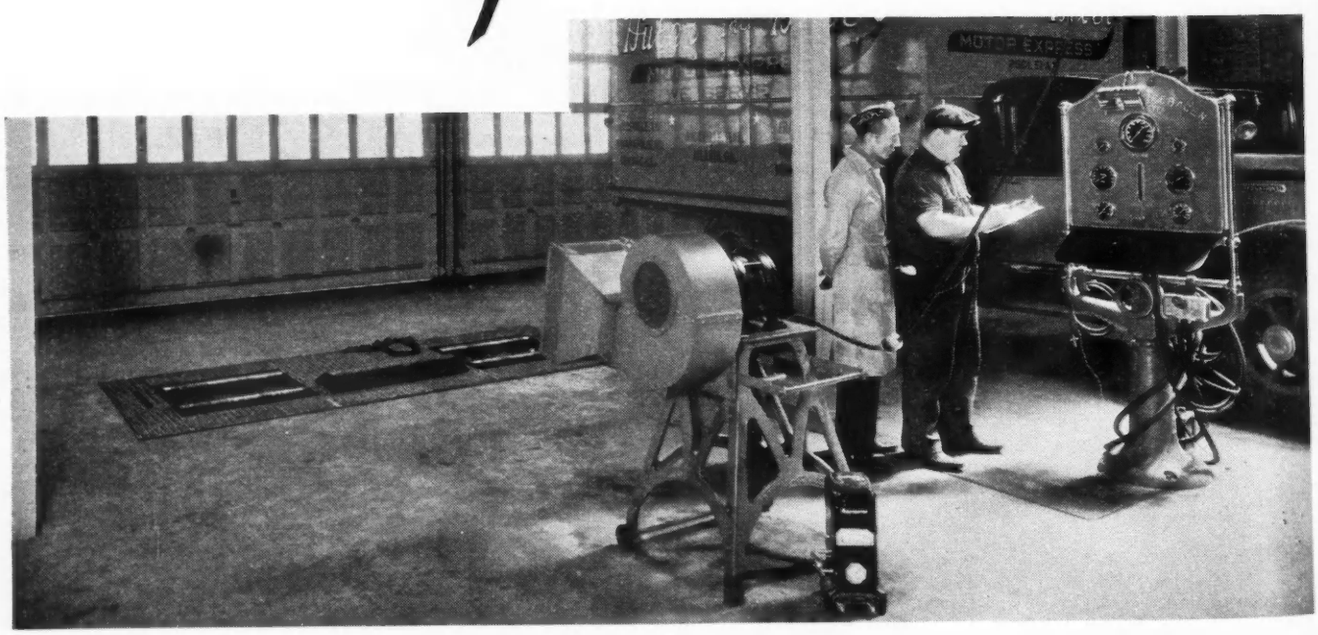


5. Cone	Forced Feed	Automatic	
Multiple Disk	Plate	Overrunning	
6. Clark	Continental	Shuler	
Timken	Eaton	Wisconsin	
7. Canti-lever	Semi-Elliptic	Coil	
Platform	Full Elliptic	Full Floating	
8. Tillotson	Bosch	Simms	
	Berling	Scintilla	Edison
9. Carbu-retor	Spark Plug	Starter	
Magneto	Generator	Switch	
10. Bevel Gear	Worm	Double Reduction	
Spur Gear	Hypoid	Chain	

(Answers on Page 62)



WE SAVED & WERE SAFER *by* INVESTING



in TESTING

Modern equipment saves $15,000 in gasoline, $10,000 in tires and $2,000 in oil during first eight months with an added bonus of fewer accidents and delays

By HAROLD WILLINGS

Director of Safety, Huber & Huber Motor Express, Louisville, Kentucky

HUBER AND HUBER MOTOR EXPRESS has recently completed in Louisville, Ky., one of the most up-to-date truck garages in the country. No expense has been spared to install in this garage the latest equipment for testing of trucks. I am sorry I am not able to give a more detailed and comprehensive report than that which follows. The reason is that it has been in operation only a few months and necessarily it has been quite a job to secure reports that will give us a complete picture.

Some of the equipment which we have in our own garage is as follows:

Dynamometer, or indoor proving ground, an instrument designed for testing the efficiency of the truck by giving torque reading, manifold vacuum, R.P.M., cylinder pressure, speedometer check and gasoline mileage test. With this instrument we are able to operate the vehicle under its own power and under conditions comparable to that of actual road conditions, load, speed and all taken into consideration.

A gas analyzer which indicates the character of the mixture of gas used in the carburetor.

Another piece of equipment called a "check-up" or Safety-Lane, which contains: Wheel alignment plates, friction brake testing machines, electrically operated for testing the capacity and the equalization of the brakes and a headlight tester.

These are the outstanding instruments used in our maintenance and safety program.

The addition of these particular instruments resulted in an increase in the working force at the garage, but taking the figures for an eight months' period, I find that this increase only amounted to 9.4 per cent whereas the truck mileage increased by 24.2 per cent and the number of trucks purchased increased 23 per cent, so taking into consideration the small increase in the garage force, I would say that considering the other increases that no additional personnel was included primarily to take care of this new testing equipment.

The "modus operandi" is to take a truck, which according to our figures shows high gasoline consumption or low compression or low power output, indicating there is something wrong with it, and place it on the dynamometer; test it according to averages, then if the truck falls below the average, the mechanics make adjustments in order to bring it up to the average or above the average.

Brakes are tested periodically, practically every time a truck enters the garage, and in order to place a truck on the brake testing machine, it is necessary for it to go over the wheel alignment plates which makes it very easy to check wheel alignment at the same time. Dials indicate brake pressure and by a system of figures we can tell exactly how many feet it takes to stop this type of equipment at practically any given speed. As two dials are involved it is necessary that each dial register exactly the same or there is not proper equalization. After these tests proper adjustments are made.

As the headlight tester is directly in front of the brake testing machine it is very easy to test headlights at the same time brakes are tested and to make the necessary adjustments while the truck is on the tester.

Our gas analyzer is attached to the exhaust pipe at the same time the truck is being tested on the dynamometer and adjustments for correct combustion are made.

What does all this testing amount to? Does it justify the expense of installing this expensive equipment? Does it result in more efficient operation? And does it eliminate accidents and delays on the highways?

The answer to all these questions is "Yes." I have in front of me an eight months' calculation which shows that our truck mileage increased a little over 24 per cent whereas our gallons of gasoline consumed only showed an increase of a little less than 16 per cent. Getting down to actual figures, the savings in gasoline alone for the eight months' period would amount to approximately $15,000 to $20,000 which would more than take care of the increase in the payroll due to the installation of this equipment and the addition of new trucks as well as the increased mileage.

During this period there was a 23

(TURN TO PAGE 60, PLEASE)

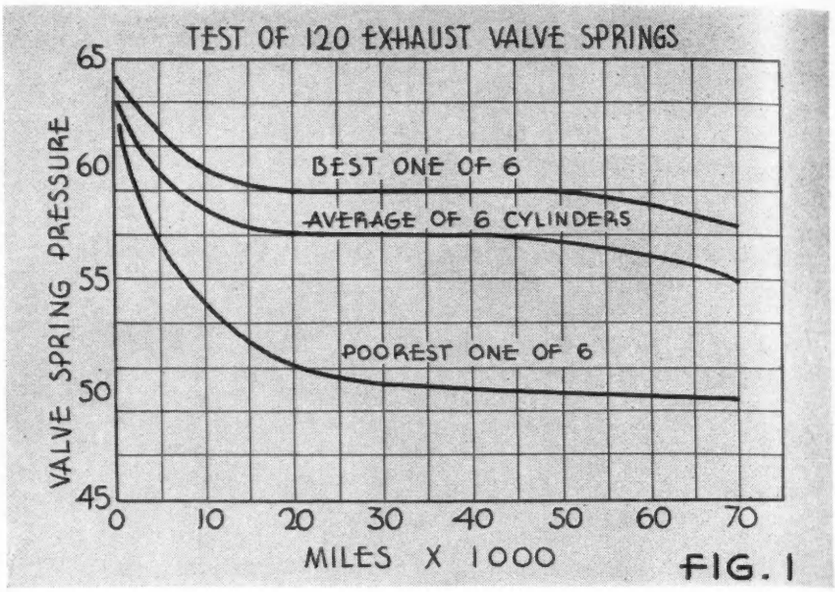


FIG. 1

Valve SPRING TENSION RATES

Fleet case study shows that engine valves die young when springs lose their springiness, and also points the way to longer valve life through proper maintenance routine

By
G. W. LAURIE*

Manager Automotive Transportation, The Atlantic Refining Co.

Every mechanic who has a valve refacer, reseating equipment and a reasonable time schedule for valve grinding jobs considers himself an expert on valves . . . but is he? This article introduces a new factor in valve lore . . . a little headwork. It is used, chiefly, not to speed up valve jobs but to reduce the frequency with which they are necessary. Records show dividends were declared.

ENGINE valves, being called upon to do a major job in the operation of the engine, are subject often, to early failure. A valve failure may not only cause poor operation with resultant increased fuel consumption, but necessitates engine dismantling for correction with a resulting out-of-service time for the truck. Truck operators know that this is expensive and, therefore, is not compatible with lower operating costs. It is obvious, that attention for the improvement of the problem is essential.

When considering the subject of engine valves, we must include the related parts which are in action during the operation of the valve, and this introduces, first, the valve spring. Fig. 1 shows a check of the valve spring pressures of 120 exhaust valves removed from 20 truck engines of the same make and size. It shows that the springs change characteristics rapidly up to 10,000 miles

* Excerpts from a paper presented before the National Transportation and Maintenance Meeting of the S.A.E. in St. Louis, Oct. 26-27, 1939.

Valve Service Record

	Odometer Reading	Miles Operated Before Needing Service
TRUCK No. 1		
Valves ground	12,000	12,000
No. 3 Exhaust Valve Replaced	23,000	11,000
No. 6 Exhaust Valve Replaced	44,000	21,000
No. 3 Exhaust Valve Replaced	47,000	3,000
Exhaust valves and springs replaced	53,000	6,000
No. 2 Exhaust Valve Replaced	83,000	30,000
TRUCK No. 2		
No. 3 Exhaust Valve Replaced	39,000	39,000
No. 4 Exhaust Valve Replaced	44,000	5,000
No. 6 Exhaust Valve Replaced	49,000	5,000
Six new springs installed	49,000	
No. 6 Exhaust Valve Replaced	76,000	27,000
TRUCK No. 3		
Valves ground	25,000	25,000
No. 6 Exhaust Valve Replaced	37,000	12,000
Six new springs installed	51,000	14,000
Exhaust Valves Replaced	83,000	32,000

FIG. 2

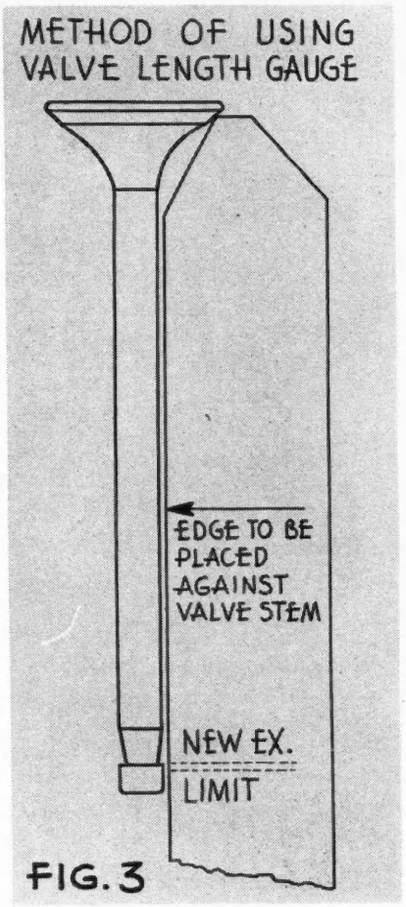


FIG. 3

ATTENTION

operation, from which point they appear to assume a set, and from here the drop in spring pressure is more gradual. The valve spring pressures of the complete set as found were averaged, and the data were plotted against operation mileage, including in the plot also the best and poorest of any six springs.

Although the average drop is about 6 lb. after 10,000 miles operation, there are one or more poor springs which dropped 10-12 lb. at this mileage. Unquestionably this item has been to a large degree instrumental in shorter valve life and, from the springs that were checked, invariably the poor springs corresponded to those valves that failed. Averaging the data further, a point of 56-57 lb. spring pressure, involving a drop of 7-8 lb. was found to be critical. Assuming a slight factor of safety, it is felt that springs should be replaced when they fall below 57 lb. This, according to Fig. 1, occurs around 40,000 miles' operation, from which point the curves again fall off.

Up to the time of this study the valve springs received very little attention, and certain units operated

(Turn to Page 66, Please)

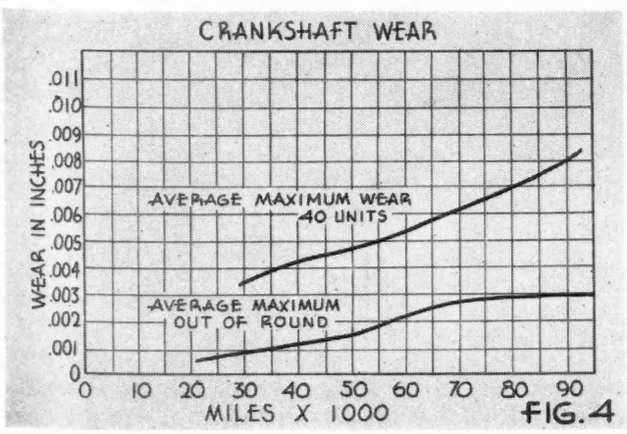


FIG. 4

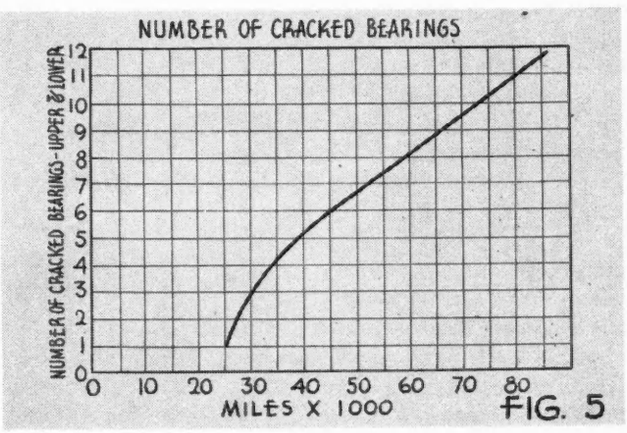
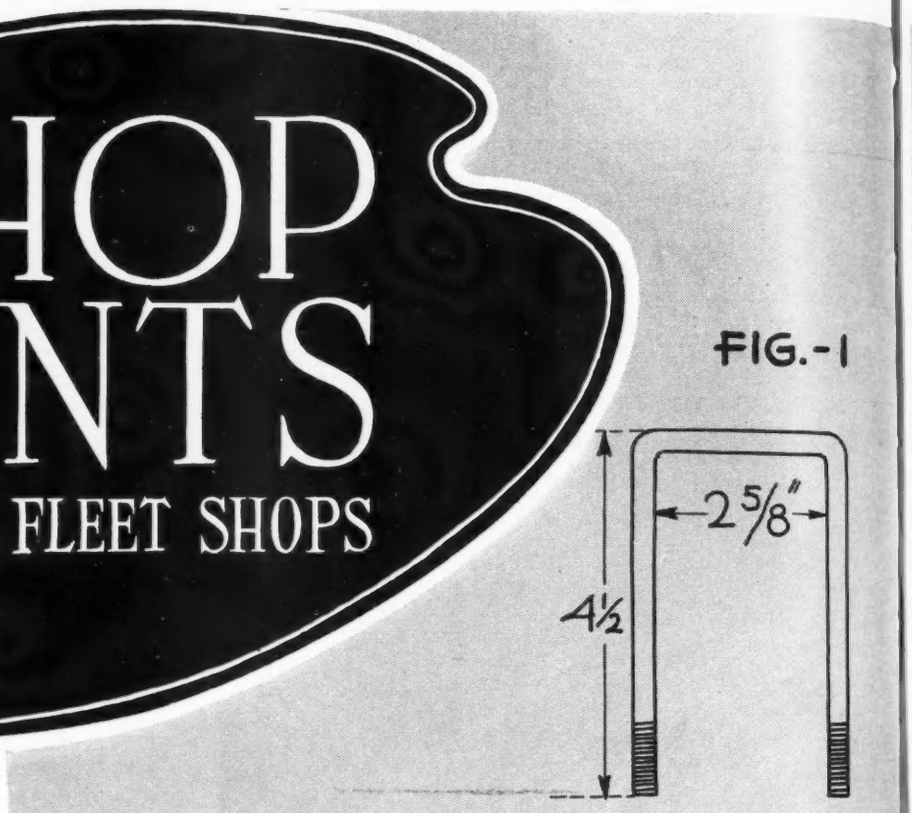


FIG. 5

SHOP HINTS FROM FLEET SHOPS



1. Exhaust Pipe Fastener

By Greaves Morris

Bellefonte, Pa.

When the studs and brass nuts used to attach the exhaust pipe flange to the exhaust manifold on a Chevrolet twist off, it is not necessary to remove the manifold for drilling and tapping.

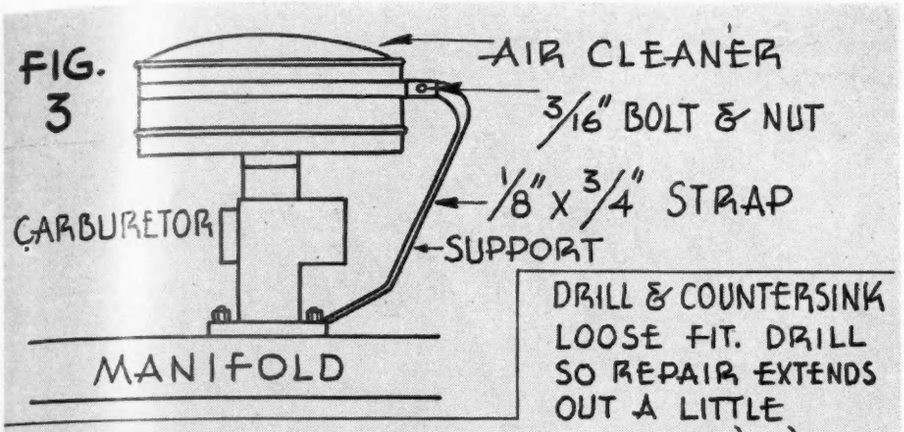
Use a piece of ⅜-in. round stock (an old brake rod will do) 11¾ in. long. Thread each end for a distance of 1 in. and then bend to form shown in sketch. Turn the exhaust flange at right angles to the engine and slip the U-bolt down over the exhaust manifold entering ends through holes in the flange. Install nuts and lock washers and the job is complete. It is a good idea to have a few of these made up in advance for emergencies.

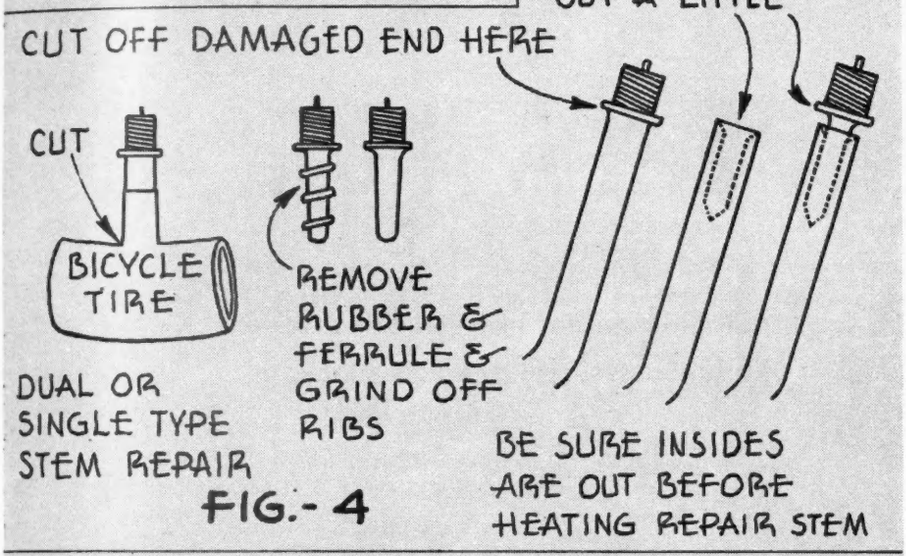
2. Transmission Stand

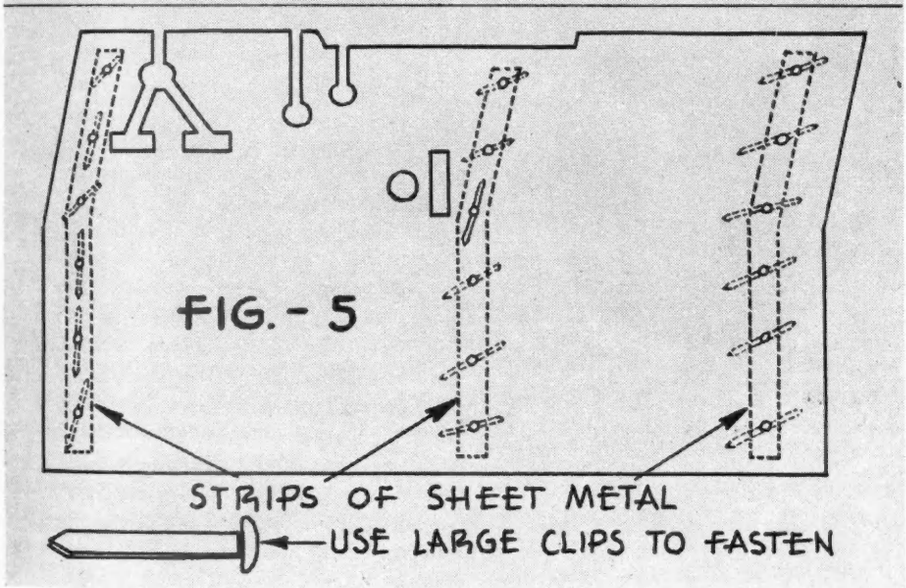
By Al Greehalgh

New Method Laundry, Stapleton, Staten Island, N. Y.

Looking over your October issue I noticed a sketch of a transmission stand so I thought I would send you one that I have been using. It is simple to make since it fits right on the work bench. If the bench top is not thick enough nail a block of wood under the bench and drill through the block. All that is needed for a Ford transmission is a 10-in. piece of ¾-in. cast iron pipe threaded on one end and a 3-in. piece of electrical conduit pipe.




DRILL & COUNTERSINK LOOSE FIT. DRILL SO REPAIR EXTENDS OUT A LITTLE
CUT OFF DAMAGED END HERE
CUT
BICYCLE TIRE
REMOVE RUBBER & FERRULE & GRIND OFF RIBS
DUAL OR SINGLE TYPE STEM REPAIR
FIG.- 4
BE SURE INSIDES ARE OUT BEFORE HEATING REPAIR STEM



The editors of Commercial Car Journal are constantly requested by readers to increase the amount of space devoted to Shop Hints. It is not a matter of space. Commercial Car Journal will double the space any time the number of usable Shop Hints makes this possible. The pay is $5 for each Shop Hint and there is no restriction on the number we will accept from any fleet. Shop Hints is a cooperative exchange of ideas and only by contributing your ideas can you continue to get the ideas of others along with the $5 bonus. Come one . . . come all!

3. Air Cleaner Bracket

By Ernest J. Lamothe

Standard Brands Inc., Springfield, Mass.

We had trouble with carburetor air cleaners falling off where our trucks traveled over rough roads. To remedy this we made a support of ⅛-in. by ¾-in. strap iron as illustrated. We used an old Ford A axle housing to bend the iron to the desired circle.

4. Tire Valve Repair

By Charles Brawford

Atlantic Refining Co., Williamsport, Pa.

This is an emergency tire valve repair since it can be done without dismounting the tire from the rim and can sometimes be done with the tire on the wheel. If a repeat repair is needed it is an easy job to apply a little heat, drop in another stem and solder the edge. The bicycle valves can be obtained from a bicycle shop. They are standard equipment on single-tube bicycle tires.

5. Floor Mat

By C. W. Lightner

General Outdoor Advertising Co., Dayton, O.

We had a lot of trouble in our fleet from floor mats becoming bunched up and ridged from the drivers constantly getting in and out. We solved this problem by putting three strips of 24 gage sheet metal under the mats and fastening through with large paper clips, putting the split ends down. The strips must, of course, be drilled first.

Design VS MAINTENANCE

Fleetmen lament the fact that they do not get full advantage of modern design because of a successful maintenance blockade

By ELLIS W. TEMPLIN*
Automotive Engineer, General Plant Division
Los Angeles Department of Water and Power

FOR the purpose of this maintenance accessibility study let us take a six-year period of comparison, since six years seems to be the approximate turnover rate in fleet operations. By that I mean that in the average large fleet there will be operating side by side vehicles which first went into service six years ago, and others which are new.

Among the innovations in truck design during this period is the cab-over-engine truck. Its advantage has been the increase of loading space for a given wheelbase, which admittedly is a most desirable feature. Yet the chief complaints from our mechanics and inspectors are directed against this type of design, because they claim that only a contortionist can service the machine properly.

The most important complaint seems to be that routine checkups are far more difficult on the newer models, due to the inaccessibility of many of the vital parts of the engine. Our inspectors have told us, for example, of a current model truck the motor of which is not open for inspection until the hood has been raised and the cab tilted. It takes four men to do this work, and before they even begin it takes another man 20 minutes to disassemble all of the units which would interfere with the operation.

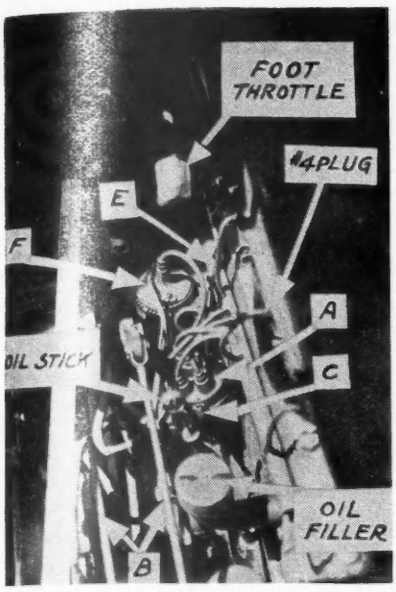
We hear of another popular make of truck which hides the ignition head in such a way that it is necessary to take off the radiator before an adjustment can be made on the head itself. Still another model features a distributor system which can be reached only after the seats, floor boards, and shift lever assembly have been cleared from the way. In order to service the air cleaner on this model it is necessary to approach it from the garage floor, and removal of the unit is a tedious and delicate operation which the mechanic must perform on his back.

On one model it is necessary to remove the front wheel and splash pan in order to make a valve adjustment, while still another is designed so that the motor must be raised before the oil pan can be removed. It is becoming increasingly difficult to follow the maze of wiring, grease and oil tubes, vacuum

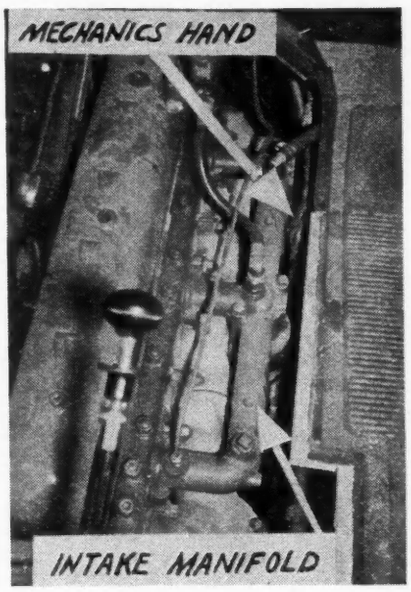
(TURN TO PAGE 72, PLEASE)

EDITOR'S NOTE This is a study in self-criticism intended, as the author puts it, to "result in the reaching of conclusions which will accelerate our progress." He gives factory engineers credit for many notable improvements but unhesitatingly and unsparingly gives them demerits for not making vehicles more accessible for maintenance. At the end of the criticism will be found views of other operators, most of whom are satisfied with current design because operating costs are still coming down.

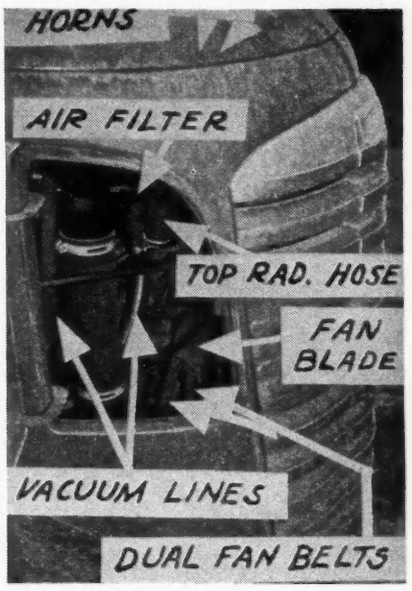
* Excerpts from a paper presented before the National Transportation and Maintenance Meeting of the S.A.E. in St. Louis, Oct. 26-27, 1939.



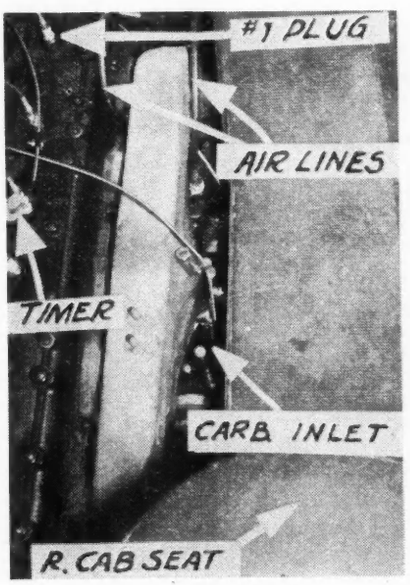
Above—It took 15 minutes to remove seat, floorboards and engine cover to get this view showing that distributor cap (A) is about 6 in. below the pedal rods (B) and hard to get to. Front cap clip (C) is so close to oil filter line (E) that it can be opened only with a long screw driver. Ignition coil (F) is on same level as the distributor. Fuel pump and sediment bowl are forward and far below the coil making them extremely difficult to service



The hand reaching through on the upper right shows the relative position of the engine and the floor board. Mechanic can barely reach butterfly set screw with a No. 10 screwdriver

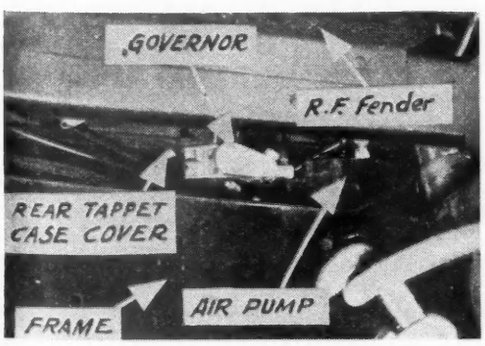


Above—This opening is 16¼ in. by 11¼ in. and it is impossible for a mechanic to work through it and see through it at the same time. No. 1 spark plug is behind the air compressor and can barely be seen with a flashlight. Front cylinder head nut can hardly be seen. Oil filter is not accessible and service men say it is impossible to service air cleaner and maintain the proper oil level in the unit because of tilting

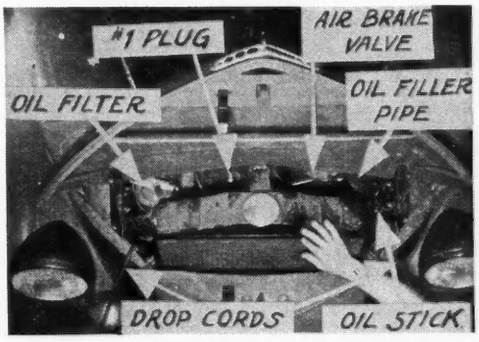


Below—A COE with right front wheel and side pan removed. Note size of opening compared with governor. To adjust tappets it is necessary to remove wheel, inspection pan, carburetor, air compressor, many lines and control linkage before mcehanic is in position to remove valve cover

Below—This view was taken from a ladder and shows relative size of hand and openings at sides and back of radiator. The spark plug is a long way down. Two 500-watt drop lights were required in conjunction with an ordinary photo flash bulb to get enough light on the inside



Above — Engine cover removed on a COE showing accessibility of cylinder head, distributor and spark plugs. Air compressor, carburetor and manifolds are not accessible and water pump, fuel pump and steering gear could not even be shown



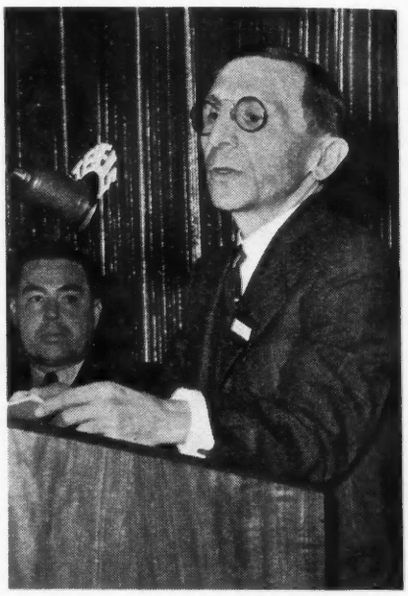
"THERE IS NO WAY IN THE WORLD TO CREATE TRAFFIC FOR THE

HARRY S. TRUMAN
U. S. Senator from Missouri

"THE LAW SHOULD BE ADMINISTERED WITH ALL

CLYDE B. AITCHISON
Interstate Commerce Commission

"DON'T LEAN TOO TRUST



J. S. ARNOLD
Kuhn, Loeb & Co., Bankers

THE Sixth Annual Convention of the American Trucking Associations, Inc., will go down in history as the moment when the trucking industry decided to engage in a large scale effort to combat the attacks of competitors and to win the goodwill of the American public.

The convention laid plans for a public relations and advertising program, professional in character, to win the confidence of the public and to convince it that the trucking industry has a right to an unhampered place in the national transportation picture because of its economical and exclusive features.

The leaders of the industry decided that a fund of $500,000 would be necessary to put over the program. The effort to raise this amount is now in progress. Truck operators are being asked to contribute an amount equal to two-tenths of 1 per cent of their gross revenues.

In his report to more than a thousand delegates and members of the industry who congregated from practically every state in the Union, Ted V. Rodgers, who was reelected president, said that 1939 has been an outstanding year for the trucking industry.

"There are many factors which have contributed to this," he said. "Foremost, perhaps, is the fact that the industry, on the whole, has enjoyed its largest volume of business. Tonnage is at unprecedented levels. Indications are that the upward trend may be expected to continue well into the spring. The primary reason, of course, is the upswing in business generally, but I believe an important contributing factor is the ever-increasing public acceptance of the type of service we render. On the average, truck loadings are up 25 per cent over a year ago. This increased volume has been accompanied by an almost corresponding increase in employment in our industry. Many companies have had to add substantially to their fleets to handle the rise in business. Unfortunately, net revenue has not kept pace with the rise in tonnage. Because of competitive conditions, rates have spiraled downward and regulation has increased our overhead."

Referring to transportation legislation which will be considered by the next Congress, President Rodgers said that if its purpose is to establish a national policy under which all agencies may serve to their fullest respective capacities, "we readily subscribe to it."

"We ask no advantages," he declared. "We want no handicaps, no punitive laws to hamstring our competitors. We are willing and anxious to assume our fair share of the burden of government. But we shall resist, with all the resources at our command, any attempt on the part of special interests to deprive us of

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RAILROADS OR FOR SHIPS OR FOR TRUCKS BY LEGISLATION"

POSSIBLE SYMPATHY FOR EVERY ENTERPRISE WITHIN ITS SCOPE".

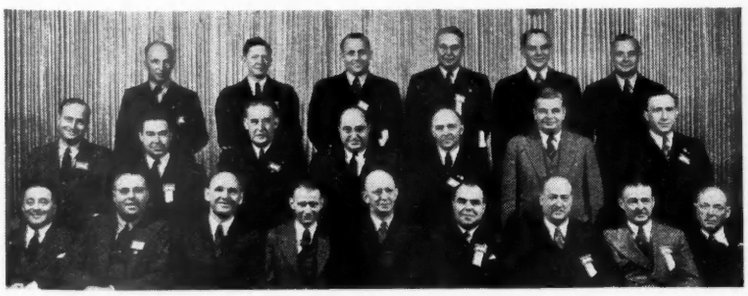
FULLY UPON GOVERNMENTAL AGENCIES IN CONTROL OF TRANSPORTATION."

PUBLIC RELATIONS PUBLIC

DOMINANT TOPIC AT A.T.A. CONVENTION

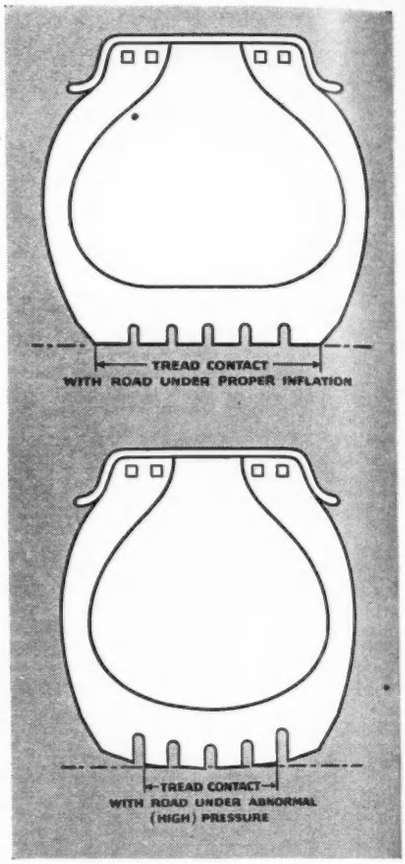
Truck industry lays plans to raise $500,000 fund to gain public confidence and support

By GEORGE T. HOOK
Editor, Commercial Car Journal



Above, top to bottom: H. D. Gibbs, president of Pennsylvania Motor Truck Association, receiving from ICC's Blanning the ATA award for doing the best state-wide safety job; Edson Smith getting the Evans and Fruehauf trophies from ATA's Rodgers for successfully defending his driver championship in the rodeo; H. D. Horton and Morgan Speir of Horton Motor Lines receiving the Trailmobile trophy from the Mayor of Cincinnati for doing the best job of aiding distressed motorists on the highways. At left: 22 of the 40 members of the ATA executive committee.

THE EVILS OF OVER INFLATION



Practice leads to greater tread wear, increases chances of breaks and bruises and decreases non-skid qualities

MOST fleet men will admit that balloon tires represent a distinct advance over the high-pressure tire. Still, some of them select balloon tires for their equipment and then operate them in such a manner that they get the effect and service of the high-pressure tire. The only increase in tire mileage in such a case is the result of recent improvements in all tire construction.

It may be that so much emphasis has been placed on under-inflation that the impression has gotten around that if normal inflation is a good thing, over-inflation is still better. If you have to make a Hobson's choice, over-inflation will probably give less disastrous results than under-inflation, but correct recommended inflation gives a result better than either.

Some operators still think they have found a way to economize by carrying loads greater than the balloon tires were built to carry and by compensating for these overloads with over-inflation. When this is done it amounts to high-pressure tire operation with the added disadvantage that the tire was not designed for high-pressure operation and has several shortcomings when used under greater pressure.

The sidewalls of a balloon tire are meant to do a certain amount of flexing. It is only through flexing that the full tread surface can come into contact with the road. Over-inflation will prevent this flexing with the result that the tire contacts the road on a crowned surface. When this happens the load is carried on the center of the crown and both sides of the tire tread surface are above the road surface. With the center of the tread surface doing more work and carrying more load than it was designed for, the rate of wear is accelerated.

The non-skid characteristics of a tire are adversely affected by over-inflation for the same reason that tread wear is increased. The reason for both is the reduction in tire-to-road contact, as shown in the illustration. With winter coming on this reduction in anti-skid value is something worth considering.

Naturally an over-inflated tire will provide a harder riding vehicle which will show up in mechanical maintenance of the vehicle. If the life of certain parts is measurably shortened by increased vibration, the cost of operation will naturally be increased. Bodies and electrical systems will probably be most affected.

In addition the tires will have a tendency toward crown breaks or bruise breaks. This is the same type of break that comes from striking a sharp object. The breaks will still come from striking a sharp object, but with the increased pressure the object causing the damage can be less sharp and the speed of the vehicle can be less with same results.

Increased pressure will also cause excessive strain on beads and rims with increased failures at these points.

QUOTES

"Retreading increases the total individual tire life 50 to 80 per cent."

•

"It is becoming necessary for all tire companies to offer retreading service on a nation-wide basis."

•

"Trailer tires give 33 per cent more mileage than driving tires and front tires 57 per cent more mileage than driving tires."

•

"Lubrication, without question, is the most important single factor in connection with engine wear."

•

"All automotive diesel engines should be provided with oil cooling radiators."

•

"The chief element of design which affects cylinder wear is temperature control."

•

"Another element of design that influences wear is top compression ring width."

TIRE RETREADING AND ENGINE WEAR

Speed-change mechanisms and maintenance problems occupy fleetmen at SAE National Transportation Meeting

TIRE retreading and engine wear discussions featured the National Transportation Meeting sponsored by the Society of Automotive Engineers at St. Louis, October 26 and 27. Fleet operators from border-to-border and coast-to-coast attended what proved to be a highly successful meeting. It was successful because of the practical nature of most of the papers presented and of the discussions which they inspired.

In addition to those devoted to retreading and engine wear, there were sessions dealing with speed-change mechanisms, color schemes and with maintenance difficulties imposed by modern vehicle design.

The paper dealing with the business and economics of renewing treads on worn tire casings was, to the best of our knowledge, the first of its kind ever presented publicly on the subject by representatives of tire manufacturers. It is a matter of record that individuals connected with tire companies have, at various times during the last five years, commented favorably—although guardedly—on retreading of tires. But their statements did not carry the weight that was given when L. W. Fox, of the Firestone Tire & Rubber Co., and A. L. MacCracken, of the Goodyear Tire & Rubber Co., presented at St. Louis a jointly-authored paper entitled "New Life in Fleet Tires." It was their conclusion that retreading or capping can be made profitable in any fleet if the following rules are diligently applied:

"1. Remove tires for capping before the last mile has been run and thus insure a higher percentage of renewable tires.

"2. Select for renewal only sound tires which show no ply separation, bad cuts or fatigued fabric.

"3. Have the work done only at reliable shops, properly equipped, and employing skilled operators.

"4. Apply tires to vehicles with some thought as to severity of the run and wheel position.

"5. Be particularly careful on dual application that tires are properly mated to insure equal load distribution.

"6. Don't expect a renewed tire to do a job that a new tire won't do."

The authors recommended that fleets do business with first class shops, and declared that "the difference in cost between the cheapest grade of materials and the best is far offset by the results delivered." Regarding results they said that, in general, "experience has proved that the use of retreading increases the total individual tire life 50 per cent to 80 per cent, depending upon the type of service, the tread design, tread widths and design depths used in the retread molds, together with the method of tread renewal used."

Tire manufacturers, the authors said, deserve the credit for the feasibility of tread renewal. They said that only a relatively few years back the tire which stayed together until

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CARRYING THE ELECTRICAL LOAD ON DIESELS

The electrician can't take a holiday when the diesel is in the shop just because it has no ignition system. It has more starter and generator than a gas engine. Here's a preventive maintenance routine for safe and sure starts

By WILLIAM H. CROUSE
Service Department, Delco-Remy Division
General Motors Corp., Anderson, Ind.

THE day of permitting the electrical equipment to operate until major repairs are required, or even until complete failure actually takes place, is now past. Experience has taught that following through on a definite system of maintenance insures normal life of the equipment and reduces road failures—that bane of the fleet operator's existence—to a minimum.

Equipment in good condition, operating normally is not apt to fail on the road. The only way the fleet operator can be sure his equipment is in good condition is to check it at definite periods. Carrying on a system of periodic checking in a shop is no easy job. It means constant vigilance. It's all too easy for the battery man, for example, to say to himself, "Don't believe I'll look at number 48 this time. It was okay last week. Besides, I got something else to do right now."

And the preventive maintenance schedule goes to pot. Then one dark and stormy night the driver of number 48 calls up the service superintendent with a very sad story about being stalled 99 miles from anywhere with a dead battery. Before 48 gets rolling again, the company is out a substantial sum—sufficient perhaps to have paid for periodically checking the battery for years.

Outlined on these pages is a suggested maintenance procedure for the electrical equipment of diesel powered trucks. The checks and adjustments discussed are essential to insure continued normal operation. The frequency with which the checks and adjustments must be made are dependent, however, upon the type of operation and the equipment. Where the fleet operator has units working under exceptional conditions, he will be able to vary the schedule to meet those conditions.

For the purpose of discussion, the schedule as outlined is set-up on the basis of 200 miles per day, six days a week. Mileage should usually be considered in preference to the time element in working out a maintenance checking schedule, but on certain applications and under specialized conditions as, for example, city delivery service, the checks should be made on the basis of hours or days of operation, since the miles per day will be comparatively low.

It is important, of course, to keep records. Some operators have special forms, which the inspectors are required to fill out as they make the checks—an insurance that the checks will be made, at the correct intervals of time.

Battery Inspection

Once a week, check the battery specific gravity with a hydrometer, and then add distilled water to bring the electrolyte up to the proper level above the plates. Avoid overfilling. The hydrometer reading must be adjusted for temperature—a point too often neglected. Add four points (.004) to the reading for every ten degrees above 60 deg. F. and subtract four points for every ten degrees below 60 deg. F.

If the corrected reading indicates a low state of charge, the battery should be removed for a recharge. A low battery condition is a danger signal—there is some definite reason for it, which must be found by checking and analysis, and then corrected if future trouble is to be avoided. Possibly the battery itself is at fault, in that it fails to take and hold a charge in a normal manner. Recharging it to see if it comes up, and if it does, checking it on the high discharge tester will reveal additional information about the battery condition which will determine whether or not the battery should be rebuilt or replaced.

If the battery is in good condition, the cause of the low battery must be looked for elsewhere. Check the generator output, and the current and voltage regulator unit settings. This will be considered in more detail under the generator and regulator checks. Never attempt to overcome

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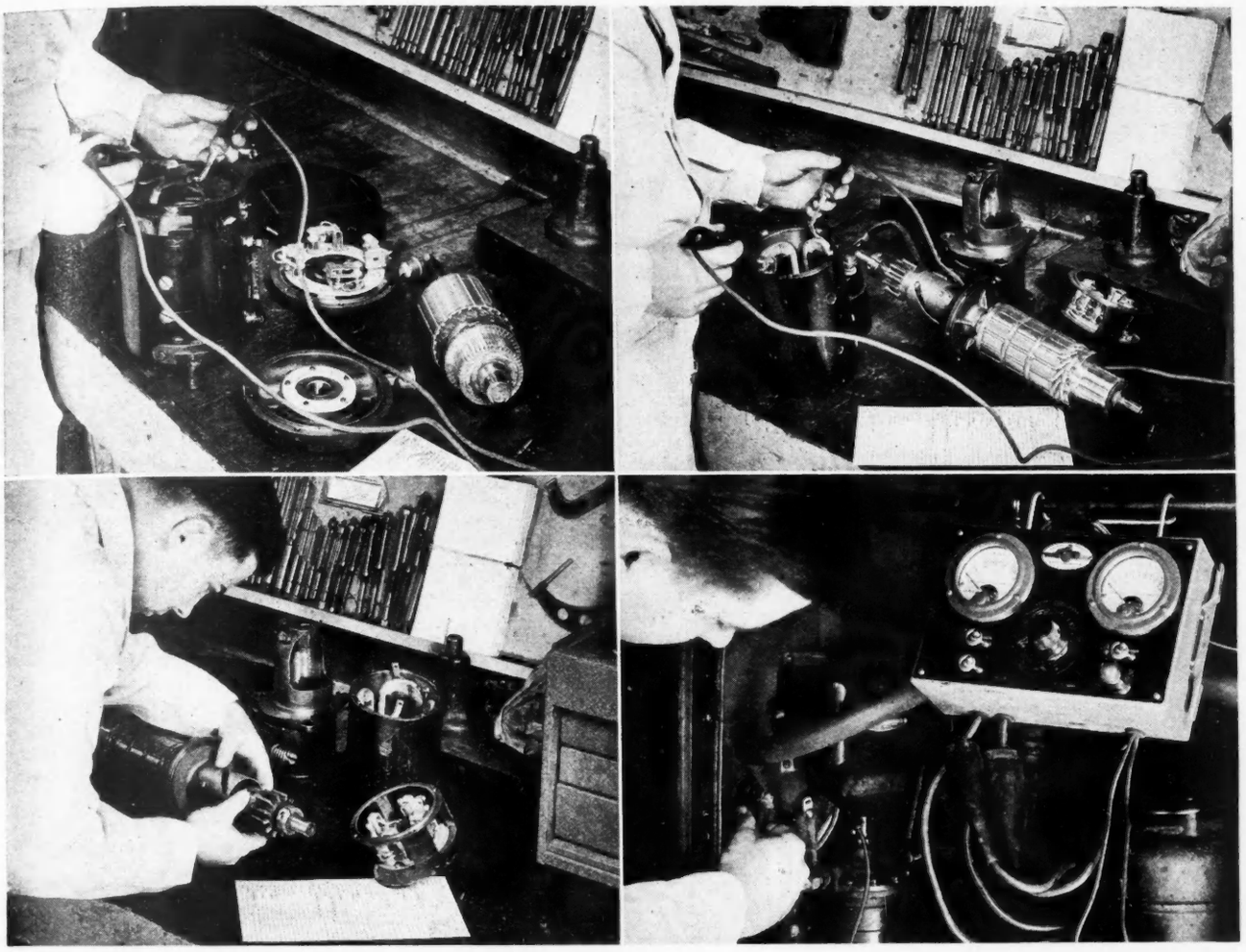
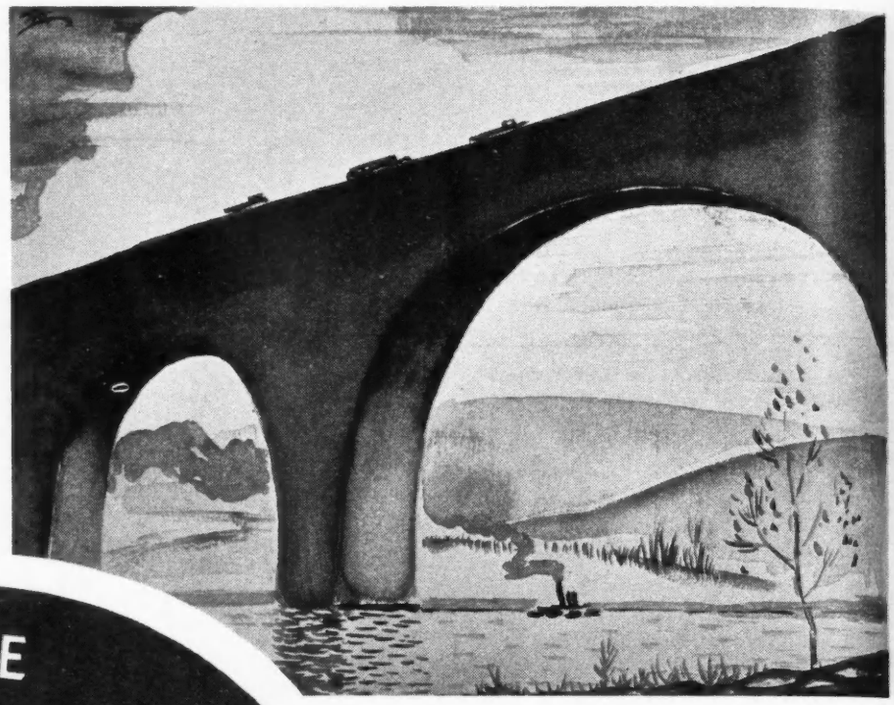


Top left—After cleaning all parts re-assemble generator. Check field electrically after soldering field connections. Top right—After cleaning parts thoroughly re-assemble starter, check field with test lamp after re-assembling fields in frame. Lower left —In re-assembling Dyer drive make sure all parts are in correct order. Check drive operation before completing assembly. Lower right—check regulator and generator output monthly.

MAINTENANCE CHART FOR HEAVY DUTY ELECTRICAL EQUIPMENT

(As prepared for Delco-Remy Equipment)

	WEEK (1200 Miles)	MONTH (4800 Miles)	3 MONTH (14400 Miles)	6 MONTH (28800 Miles)	YEAR (57600 Miles)
BATTERY	Check specific gravity. Add distilled water Check terminal connections. If battery uses excessive water, check regulator or third brush setting, reduce if necessary. If battery gravity is low, check generator output and regulator setting. Recharge battery.	Clean battery top.	Disconnect and clean all connections. Inspect cables and replace if necessary.	Clean and paint battery compartment with acid-proof paint. Remove and clean battery.	
GENERATOR	Check all terminal connections for tightness. Check mounting for looseness. Note belt tension. Lubricate.	Remove coverband. Inspect brushes and commutator. Check output.	Check brush spring tension.		Disassemble generator for complete overhaul. Replace all worn parts.
REGULATOR	Check terminal connections for tightness.	Check voltage and current settings, and cut-out relay closing voltage. Adjust if necessary. Clean contacts if necessary.			
CRANKING MOTOR	Check all terminal connections for tightness. Check mounting screws and solenoid mounting. Make sure all terminals are covered to avoid grounding. Lubricate.			Remove cranking motor from engine. Clean drive. Remove coverband and inspect brushes and commutator.	Disassemble for complete overhaul Replace all worn parts.
CRANKING MOTOR SWITCH	Check all terminal connections for tightness. Make sure all terminals are covered to avoid grounding.				
ENTIRE WIRING SYSTEM				Check wire completely for chafing, wear, frayed insulation. Check all connections carefully.	



THE Body OF THE MONTH

PREPARED AND COPYRIGHT

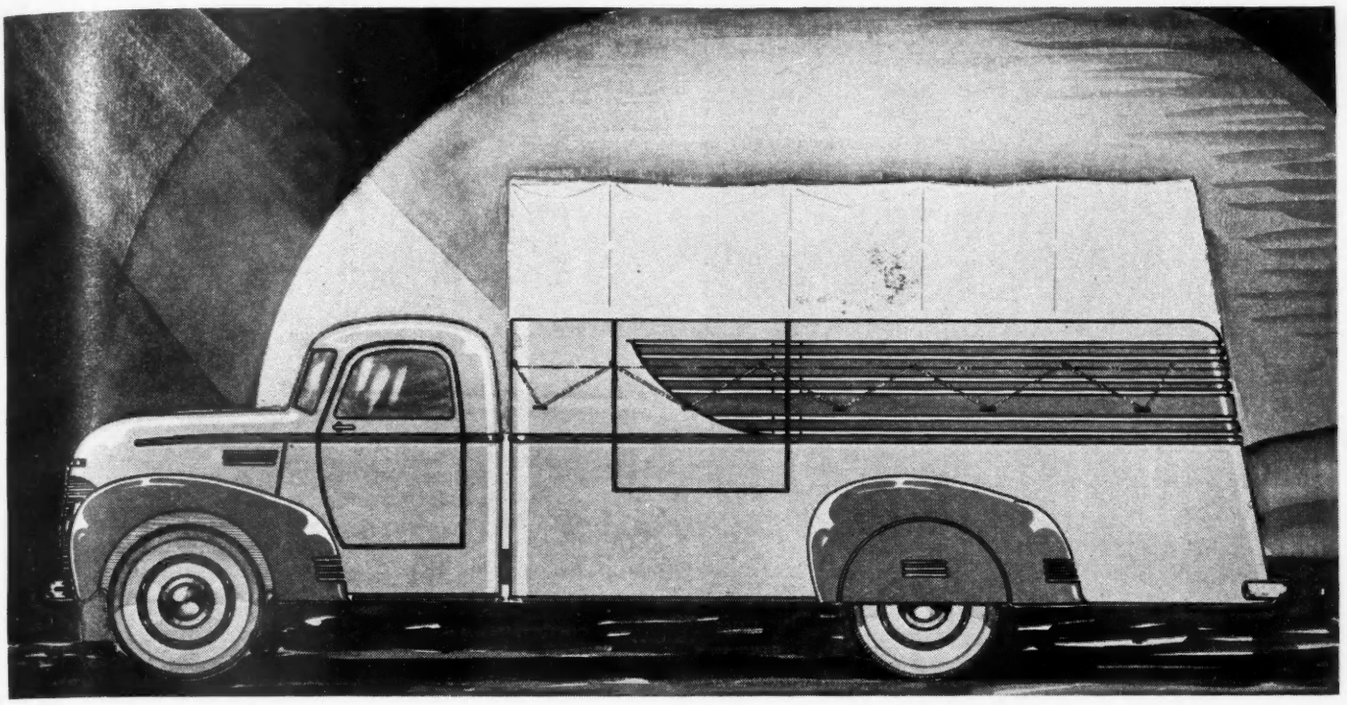
This is the fourteenth in Commercial Car Journal's series of original body designs. Again we remind fleetmen that the designer has worked in body shops and knows the practical problems of building truck bodies. All designs are copyrighted, but arrangements can be made with the designer for procuring complete construction drawings and specifications. Both the designer and the editors welcome comments and also suggestions for designs of particular body types. Simply address The Editor, Commercial Car Journal, Philadelphia, Pa. Next month—A gasoline and oil body

VOCATIONAL USES

The design of the month for December was created as a job to dovetail into truck fleets in a variety of vocations for general utility work. In some instances, it will go beyond the utility requirements and serve some vocations 100 per cent. It is a combination of a platform and rack side body with removable bows and tarpaulin. Its uses are varied, covering a great many truck operations, some of which are lumber and millwork, milk cans, furniture, drum products, steel, grains, general express and light-weight bulk products.

DESIGN FEATURES

The outstanding feature of this design is its adaptability to a wide range of uses which are illustrated in the cutaway isometric view looking forward from above the right-hand rear corner. One half of the body is shown with the side and end gates and racks removed, converting it into a low-side platform body. The remaining half is shown with all the side racks and gates in place, effecting a rack side body. In addition to this, portions of the removable bows and tarpaulin which make it into a closed body are shown.



1939 BY E. M. WESTBERG — DESIGN NO. 14—A RACK SIDE BODY

DIMENSIONS

The body is so designed that it can be built in a variety of sizes to suit the vocation and volume of hauling. The unit illustrated is approximately 15 ft. long by 7 ft. 4 in. wide with 12-in. high solid sides, 42-in. high racks and a 6 ft. clear height under the tarpaulin bows. There are no wheel boxes, but where greater inside height is desired with no increase in overall height they can easily be built in.

MATERIALS

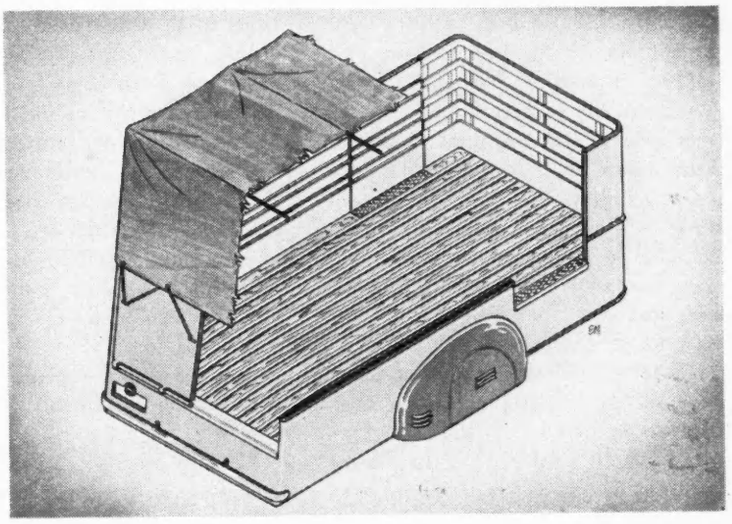
Construction would vary somewhat with the type of material hauled. Under normal conditions hardwood under-structure, floors and framing would be used, with stretcher-leveled steel panels in the solid portion of the body. Where heavier materials are to be carried the use of steel under-structure and reinforcing members is suggested. The bows should be round iron or hollow steel tubing and the tarpaulin a heavy grade of water proof canvas.

DETAIL FEATURES

The floor is loped down at the rear end to give a low-loading height at this point and is also protected against scuffing by the use of steel strips placed over the joints, the number of strips used varying with the width of the floor boards. Heavy diamondette scuff plates are placed at the two side gates and at the rear for additional protection. A tail gate is shown but where an operation does not require a tarpaulin, the gate can easily be replaced by stakes. The license bracket and tail lamp are recessed into the rear skirt. A chrome-plated spring steel bumper is used for additional trim.

COLOR SCHEMES

A two-toned color set-up with a matching trim is recommended, with the main portion of body and chassis painted in the light shade, with the fenders, belt molding and side exposed rails painted the darker shade. The belt molding is trimmed underneath with a strip of the same matching color used on the wheels.



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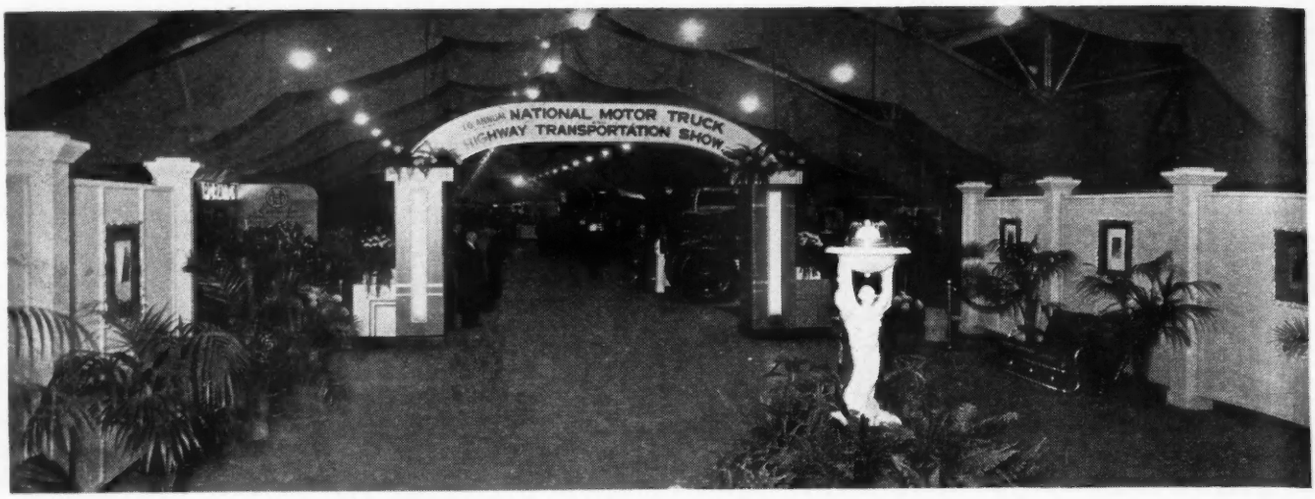


NATIONAL TRUCK SHOW

Plays to select crowd on Navy Pier with supporting cast that ranges from oil filters to a 50-ton coal trailer

By GEORGE APPLEGREN
Special CCJ Correspondent

RECKONED by the standard that many hundreds of visitors were either buying at the moment or assured exhibitors that they would soon be in the market for new equipment, the Sixth Annual National Truck Show, held Nov. 8 through 16 at Navy Pier in Chicago, must be set down as a success. This despite the fact that only about half as much space was sold as for the New York show last year, and also that crowds were not as great as at New York.

Off to a slow start the first three days, things began picking up over the week-end and the final six days were busy ones for everybody. Many hundreds of out of town visitors who were attending the annual conventions of the American Petroleum Institute and its running mate the Interstate Conference on Automotive Taxation were attracted to the show. Many exhibitors anticipating that they would have calls from men high in the oil industry showed tanks and equipment for their uses.

Assurance that the show will be held in 1940 and that plans have already been made to carry it on as a regular annual event for many years to come, was given by John F. Winchester, president and general manager.

"It is a strange thing about show crowds," said Mr. Winchester. "While we had expected more exhibitors and had hoped that the crowds would be larger than in New York, this show must take its place in history as one of the most successful truck exhibits ever held. The type of crowd has been everything anyone could possibly ask for. There have been few idlers. Those who came were people who earn their livlihoods with trucks. They were drivers, fleet mechanics and operators. And after all, a hundred of that type of crowd can mean far more toward a successful show than a thousand who come only to look and be entertained. From my talks with exhibitors I know that everyone is well satisfied. Quite a number of our exhibitors booked good sized orders on the floor, and they all secured names of good prospects to work on in the months to come."

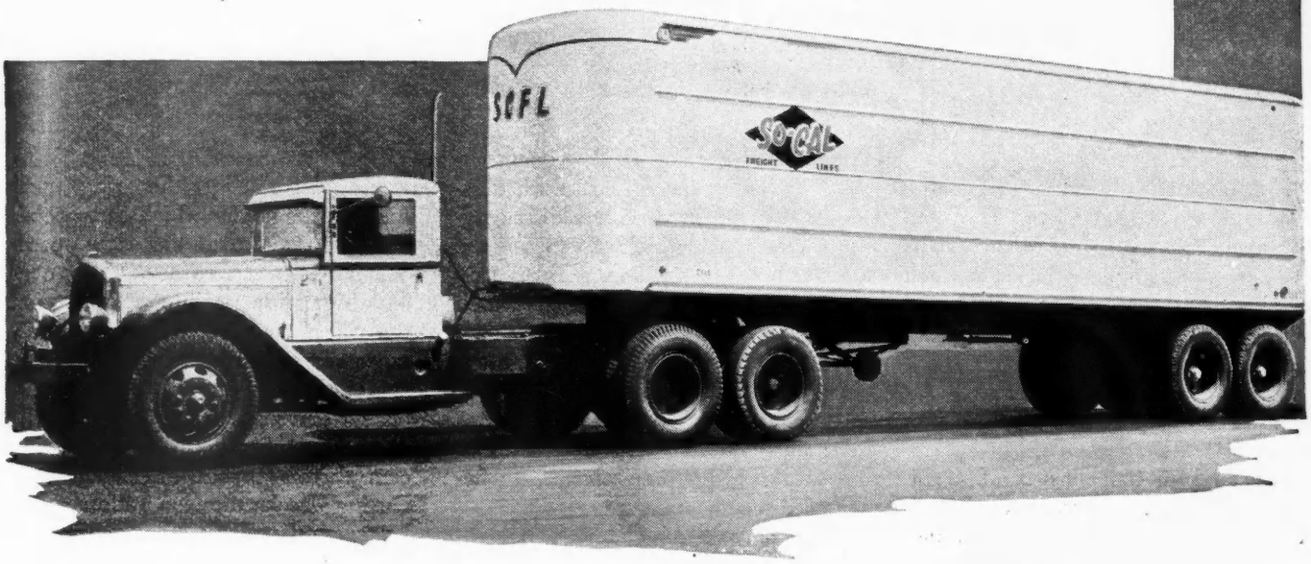
That the show may be held at Chicago again next year is likely. Navy Pier was said to be a good place for the show, with the advantage of placing large equipment along the walls of the wide exhibition hall. Exhibitors said they believed holding it in conjunction with the convention of the Petroleum Institute and the Interstate Conference on Automotive Taxation had much to do with the kind of crowds that were attracted. These people, they said, were in Chicago for the conventions and since they were on the ground on business the show was a natural magnet.

Almost every kind and type of commercial fleet equipment manufactured was on display. There were

(TURN TO PAGE 58, PLEASE)

EXIDE-EQUIPPED

Diesel tractor semi-trailer units cover tough run in Southern California . . .



STARTING at San Diego with a semi-trailer loaded with general merchandise, these Diesel-powered units of Southern California Freight Lines climb up 4000 feet from sea level . . . then roll down to towns in the Imperial Valley that lie at sea level and below. Within nine hours the tractor unit is back again in San Diego with a load of the Valley's dairy products, carried in an insulated semi-trailer.

A tough run and no mistake . . . and one that makes the use of dependable equipment all-important. It is not by chance that these haulage units are equipped with Exide Batteries, which crank the Diesel engines in addition to their other duties. As a result of the satisfaction received from these batteries, Southern California Freight Lines has now standardized on Exide.

The Exide line is complete, with heavy-duty Exides for all commercial vehicles, and Exides for cranking Diesel engines. Why not put Exides to work in your fleet, and let them start cutting your battery cost per mile? See your Exide Wholesaler today, or write to us.

Exide

HEAVY DUTY BATTERIES

for Commercial Service

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia

The World's Largest Manufacturers of Storage Batteries for Every Purpose

Exide Batteries of Canada, Limited, Toronto

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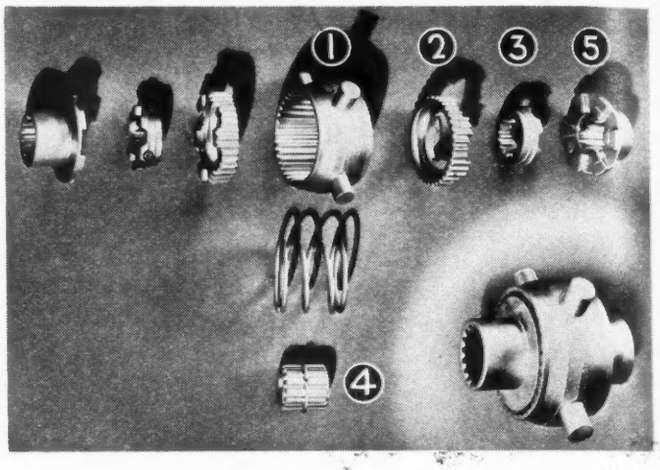
THORNTON TANDEM SELF-LOCKING DIFFERENTIAL



Parts of the new Thornton Tandem differential. Explanations below

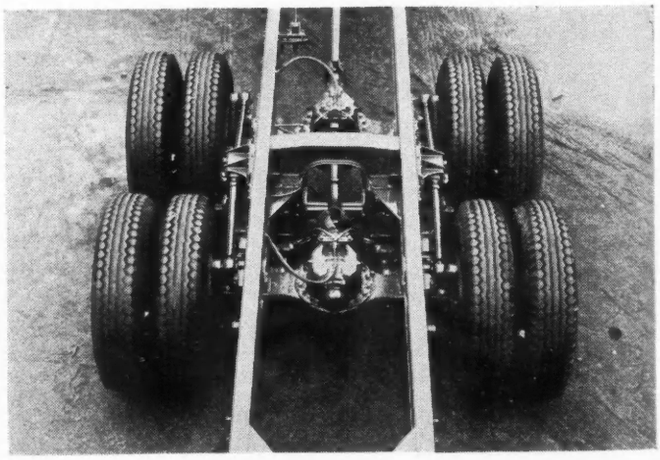
AN automatic locking differential has been developed by the Thornton Tandem Co., Detroit, Mich. It is offered as a complete package which can be substituted for standard axle differentials. At present units are available for Ford, Chevrolet and Timken 53,000 axles. Additional models are being developed for other popular trucks.

The differential consists of a spider (1) which contains driving clutches (2) on each side, splined and driven by the spider. Each driving clutch is fitted with a dis-engaging cam (3) which floats in the clutch but is splined to a slidable on the spool (4). The driven clutch (5) engages with the driving clutch (2) and is positively driven at the speed of the spider. The coil spring fits over the spool, spacing the cams (3) and aids in lateral movement of these parts when one wheel is to become disengaged.

Normally both clutches are directly driven by the ring gear through the spider which causes both wheels to rotate at the same speed. When turning a corner, going over an obstruction or into a depression the wheel traveling the shortest distance remains directly driven by the spider, but the faster turning wheel clutch driven member overruns its driving member and the disengaging cam throws it out of engagement. During deceleration operation would be reversed under similar conditions.

STERLING OFFERS NEW DUAL-WORM-DRIVE UNIT

New Sterling six wheeler and details of dual-worm-drive rear



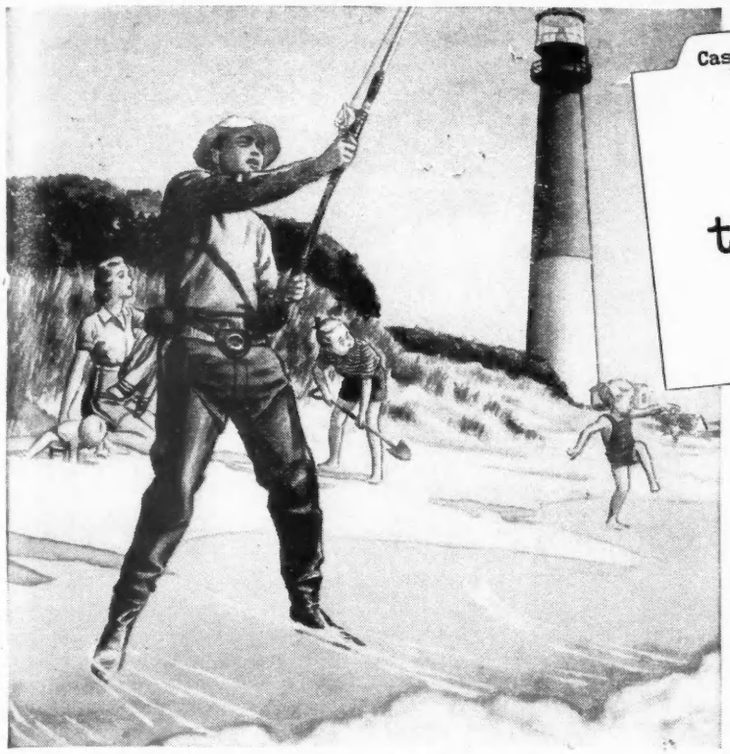
THE Sterling Motors Corp., Milwaukee, Wis., announces a dual worm drive chassis, the Model NWS160H which is recommended to haul a total gross train weight of 60,000 to 68,000 lb. in highway operations with the load distributed in such a manner that approximately 34,000 lb. gross is placed on the truck itself. These ratings will vary with the type of operation, but for ordinary highway operation these ratings will apply.

This light-weight dual drive chassis is available with either gasoline or Diesel power.

It features the use of a tandem axle unit which is equipped with heavy cast steel housings which are of the type to provide universal action, liberal road clearance, and maximum operating efficiency.

Light-weight alloys are used for those parts not subjected to severe stresses and strains.

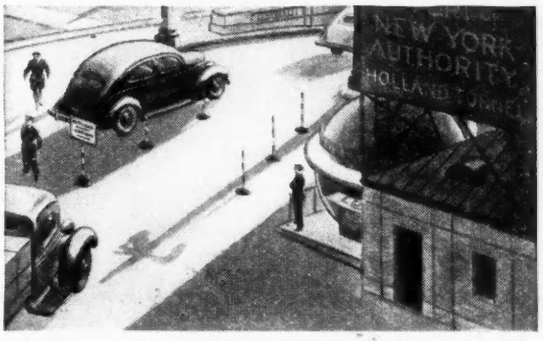
This model chassis employs the wood-lined frame.



Case #570

The Case of the 7-year Sleep

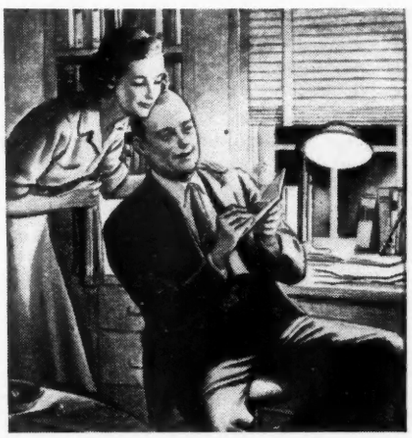
(A TRUE STORY)



1. **A New York business man** had two loves—fishing and his family. So, last summer when his wife and youngsters went to his distant, ocean-front cottage, he resolved to spend every week end with his family—and the fish. That long, two-way motor trip was the means of rousing him from a 7-year sleep.

2. **For, though he** had used Gulfpride for 7 trouble-free years, he had no idea how great it is. His eyes were opened when, on a trip from the seashore, he used another oil. Arriving in New York, he found to his amazement that *2 quarts had burned away.*

3. **The next few week ends** he was in the midst of an experiment—to see whether *any* oil was as thrifty as Gulfpride. On successive trips he tried successive oils—same car, same speed, same roads. In all, he tested 4 famous premium oils—*and each one showed a loss of about 2 quarts!*



4. **Convinced,** he went back to Gulfpride. Whereas the other oils had lost about 2 quarts each way, *he drove two full round trips before his oil level dropped an inch!* Says this modern Rip Van Winkle: "Gulfpride saves me at least $16 a year on oil alone, not to mention repairs!"

If you want to save on oil and on bills for "fixing" your car—switch to Gulfpride.

Because—as you can easily prove—using Gulfpride *does* mean adding less oil between drains . . . *does* mean less carbon cleaning and lower repair bills! And the reason *why* you get these unusual results is because Gulfpride is an unusual oil.

It's the only 100% Pure Pennsylvania refined *both* by conventional methods and by Gulf's exclusive Alchlor process. Costs no more than other premium oils . . . Gulf Oil Corporation . . . Gulf Refining Co., Pittsburgh, Pa.

• • •

LISTEN TO Gulf's "Screen Guild Theater" starring Movieland's biggest names! Sunday evenings, 7:30 E.S.T., Columbia Chain.

Gulfpride Oil

100% Pure Pennsylvania, at Dealers' in sealed cans only

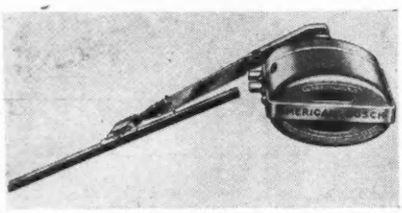
GULF

BUS AND FLEET OPERATORS: Gulfpride will save YOU MONEY—Try it in your fleet TODAY!

SHOWCASE of New Products

Bosch Electric Wiper

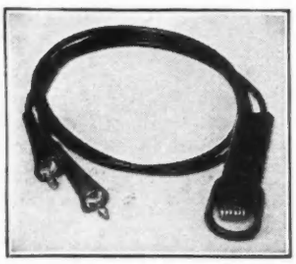
A new electric windshield wiper for trucks, buses and business cars, featuring an unusually powerful motor has been announced recently by the American Bosch Corp., Springfield, Mass. The "Neverstall" motor is compact in size and will drive various sizes of arm and blade assemblies up



to those with 12-in. arms and 14-in. blades. It is available in three different wiping angles—85, 110 and 135 deg. The arms are adjustable in length and the blades have 10 wiping edges and a spring control feature to prevent chattering.

King Timing Light

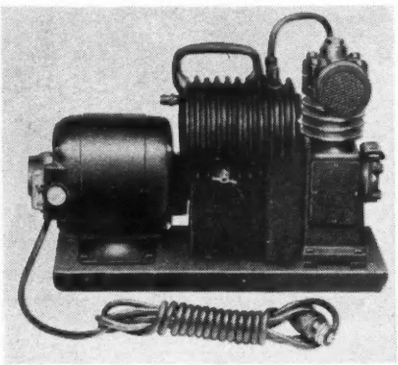
A new testing device known as the "King" Timing Light has been placed



on the market by the Electric Heat Control Co., 9127 Inman Ave., Cleveland, Ohio. In addition to checking ignition timing, the instrument may also be used for checking every part of the distributor such as a bent shaft, worn bearings, uneven lobes on the cam or synchronization where double breaker points are used.

DeVilbiss Spray Outfit

The DeVilbiss Co., Toledo, Ohio, has a new direct-drive spray painting outfit for medium and light-duty service. It is known as the type NCK and is operated by a 1/3-hp. electric motor. The piston type compressor is directly connected with the

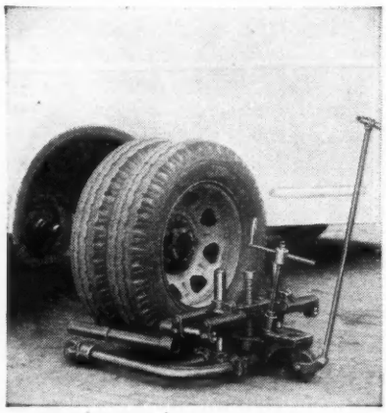


motor and it has a capacity of 4.58 C.F.M. The compressor holds the type GC spray gun at 38½ lb.

The assembly is mounted on a rubber footed base. The flywheel also acts as a fan for cooling. A finned air chamber relieves pulsation and acts as an oil and moisture separator. There is a drain valve and a safety valve. It is equipped with 12 ft. of electrical cord.

New Truck Wheel Dolly

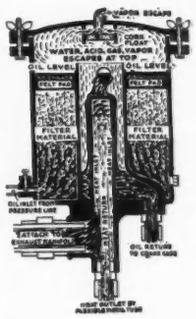
A wheel dolly designed to facilitate easy removal of heavy truck wheel assemblies is being produced by the Electric Service Supplies Co., 17th and Cambria Sts., Philadelphia. Frame is constructed of heavy wall tubing and mounted on three wheels provided with anti-friction bearings. Front wheel is steerable. Elevating arms are raised and lowered by means of a rotating



shaft with handle, through a spiral bevel gear set. Entire assembly is below wheel hub.

Oil Filter for Diesels

A combination oil filter and refiner, known as "Reclaimo" is now available in a size for diesel engines. With its larger filtering capacity and a flow of about 18 gal. of oil per hour, it should prove satisfactory for even the largest automotive diesels. The device is attached to the exhaust manifold and features a heating unit as well as an easily changed filter pack. Construction is of aluminum alloy. The Reclaimo Mfg. Co., 2306 N. Western Ave., Chicago.

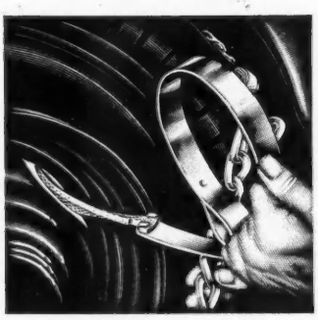


Valve Seat Refinisher

A new lightweight, air-operated, valve seat refinisher is now available from the Snap-on Tools Corp., Kenosha, Wis. The oscillation and rotation movements are adjustable in relation to each other, and speed can be instantly varied up to 3,000 strokes and 160 revolutions per minute by pressing the finger control. The die-cast abrasive blocks are machined to within .0005 in., guaranteeing full and even abrasive contact. Tool weighs only 3 lb. All equipment needed to handle any valve seat is included in the complete set illustrated.

1940 Claw Chain Line

Featuring the patented "Claw" cross chain links with their protruding "V" of steel, the Columbus-McKinnon Chain Corp., of Tonawanda, N. Y., has announced its 1940 line of complete chain



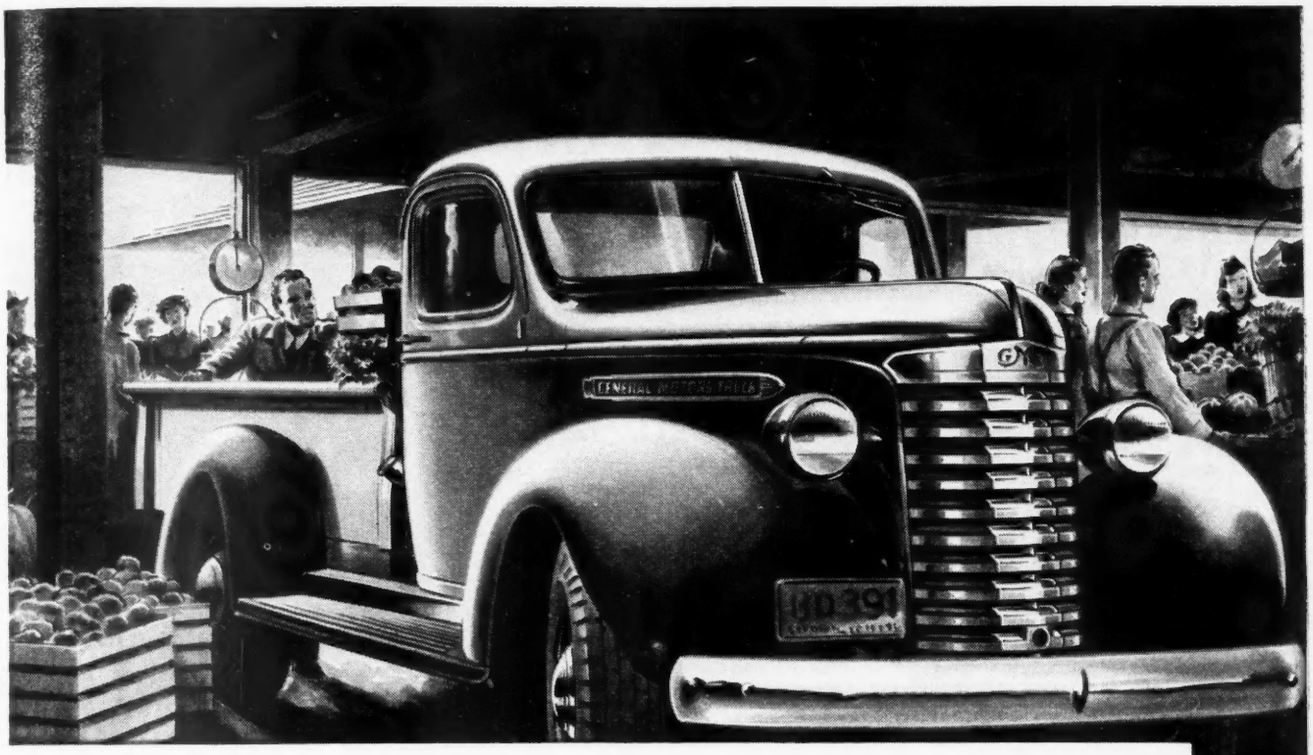
assemblies and emergency chain units. Each type is built with "Claw" links of special alloy steel, putting extra concentration at the wearing point.

The company also offers an attaching hook (illustrated) for quick and easy installation of strap-on type emergency chains.

1940 NoRol Ready

Wagner Electric Corp., St. Louis, has announced that "NoRol," its automatic device for holding vehicles from rolling backwards when stopped on up grades, is now available for practically all 1940 automobiles and most trucks equipped with hydraulic brakes.

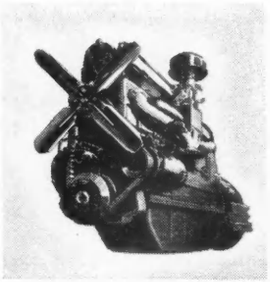
(More New Products on Page 92)



Outpulls, Outperforms, Outsaves!

Owners Say **"IT'S THE BEST LIGHT-DUTY TRUCK"**

AND HERE ARE THE REASONS WHY:



GMC SUPER-DUTY
Engines Have
MORE POWER

General Motors Trucks accelerate faster, pull better on hills! GMC *Valve-in-Head* engines with POWER-PAK Pistons get more work out of gasoline than any other truck engine.

This Advanced
STYLING
Pays Dividends

GMC Trucks are styled by the world's foremost automotive designers. Here's distinctive beauty that makes people take notice, builds prestige and advertises your business wherever you send your trucks.

RECORD-BREAKING
Gas Economy

Owners report 15% to 40% greater gas mileage than any other light-duty truck! Let your GMC dealer make the Mileage Meter Test and PROVE gas economy greater than you've ever known before.

MORE
Driver Comfort
BETTER VISION
Easier Handling

GMC RIDER-EASE Cabs have form-fitting seats, insulated roof and floor for all-weather comfort, broad, V-Type windshields for real Safety-Vision. No other truck drives easier!

Check GMC PRICES
with the 3 LOWEST

Thousands are amazed to find that a truck-built GMC actually costs little or no more to buy. See your GMC dea'er.

TOP-SIZE
Factory-Built
BODIES

No other light-duty trucks give you more load space than you can get in a GMC. All GMC Panels are insulated to protect your loads — GMC Pickups are all-steel, last longer.

Our own YMAC Time Payment Plan assures you of lowest available rates

GMC TRUCKS TRAILERS - DIESELS

·THE TRUCK OF VALUE·

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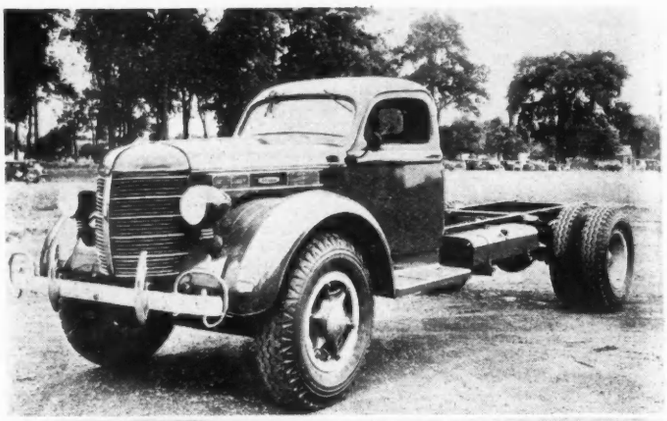
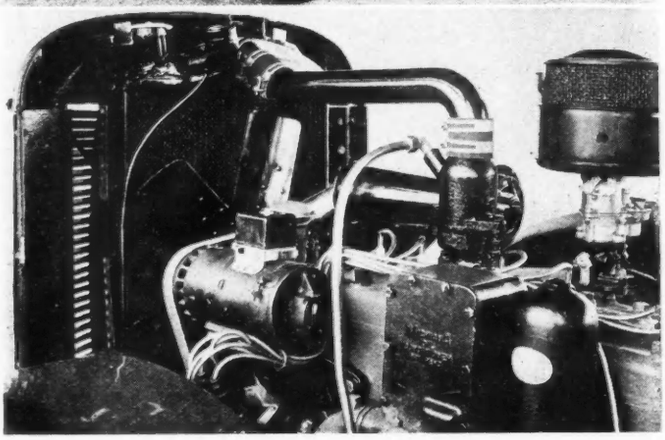
GRAMM

1940 LINE HAS GREATER LOAD SPACE, BETTER DISTRIBUTION





Illustrations show Gramm heavy-duty chassis and underhood details including radiator core independently suspended

THE Gramm Motor Truck Co., Delphos, Ohio, announces a new 1940 line of trucks ranging from 6500 lb. gross rating to 28,000 lb. gross rating. These trucks feature greater loading space with shorter wheelbase, easy accessibility, shorter turning radius, better weight distribution and advance styling.

Engine sizes range from 205 cu. in. to 404 cu. in. They are made by Hercules and they have high turbulence heads, chrome molybdenum cylinder blocks, cadmium nickel precision bearings and Tocco-hardened crankshafts. Pistons are of aluminum alloy. Torque increases are on the order of 20 per cent. Larger than standard engines are available for every model as are optional gear ratios and other equipment to tailor the truck to the customer's conditions.

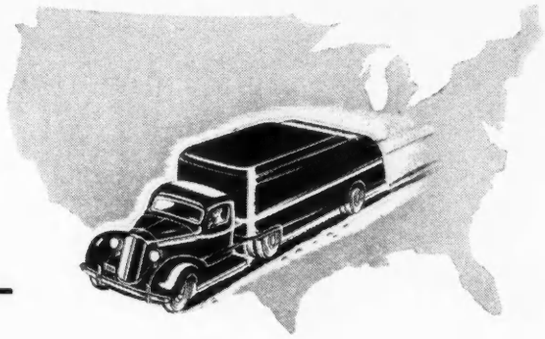
As an example of the increased loading space, last year's truck of 136-in. wheelbase had a CA dimension of 55 in. A comparable truck of this year's line on a 131-in. wheelbase has a CA dimension of 60 in.

All models have pre-lubricated clutch throw out bearings and self-aligning propellor shaft center bearings in the longer wheelbases. All models are of the deluxe type with all equipment common on this type.

The service brake hookup is interesting in that the pedal shaft is carried through the frame to the outside where the master cylinder synchronizer and vacuum booster are mounted. This provides accessibility and a rigid and trouble proof design. Gasoline tanks are mounted outside the frame on the larger models. The radiator core is mounted on the front cross member and supported by radius rods to the cowl, but is completely free of connection to the radiator shell or front sheet metal eliminating trouble in case of frame twist.

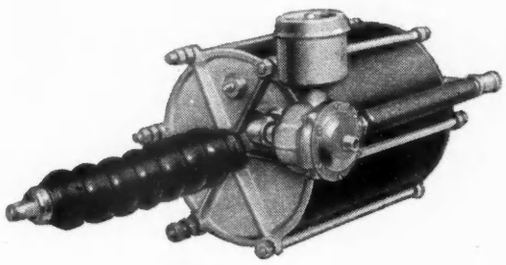
New Truck Registrations by Makes by Months

	Auto-car	Brock-way	Chev-rolet	Diam-ond T	Dodge	Fed-eral	Ford	G.M.C.	Hud-son	Inter-nat'l	Mack	Ply-mouth	Reo	Ster-ling	Stude-baker	White Indiana	Willys	Misc.	Total
January.....1939	143	127	13,615	378	4,002	85	10,188	2,384	47	4,709	482	507	168	25	169	348	135	293	37,715
January.....1938	130	64	10,338	357	3,145	118	9,304	1,777	103	4,581	257	691	217	16	161	301	206	229	31,995
February.....1939	134	98	12,007	308	3,821	79	9,224	2,218	44	4,284	393	510	159	29	143	275	97	274	34,102
February.....1938	96	57	9,174	350	2,677	110	7,863	1,424	81	3,847	223	587	184	9	147	319	142	261	27,551
March.....1939	150	168	16,565	392	4,852	122	11,886	2,772	39	5,507	483	879	175	17	190	373	148	365	45,083
March.....1938	110	86	12,598	395	3,752	138	10,175	2,010	79	5,382	357	798	291	17	163	388	178	338	37,255
April.....1939	149	139	16,386	515	4,688	137	11,631	3,170	53	5,617	547	1,014	106	24	172	421	141	291	45,201
April.....1938	119	127	11,824	421	3,618	130	9,437	1,898	79	4,850	370	766	263	26	184	356	175	391	35,034
May.....1939	184	177	15,899	427	5,185	173	11,706	3,215	44	5,359	666	1,118	78	45	196	442	166	301	45,381
May.....1938	193	159	10,918	378	3,252	95	9,117	1,853	68	4,372	383	678	291	25	224	366	172	393	32,937
June.....1939	162	177	14,049	408	4,442	123	10,606	2,740	47	5,105	588	889	53	25	209	446	185	228	40,482
June.....1938	235	116	10,034	340	3,095	97	8,510	1,762	67	4,136	321	692	224	21	159	313	197	328	30,647
July.....1939	300	170	15,432	436	4,562	116	12,514	2,872	43	5,744	541	946	31	28	229	379	133	271	44,747
July.....1938	129	99	11,225	382	3,236	117	9,425	1,675	67	4,782	347	660	264	34	116	337	182	398	33,475
August.....1939	185	146	14,327	449	4,709	158	12,090	3,031	28	6,101	524	793	28	38	238	377	92	209	43,523
August.....1938	88	111	11,268	397	3,286	125	9,471	1,909	61	5,361	370	593	231	23	209	289	158	281	34,231
September.....1939	191	157	9,132	496	4,169	159	7,288	3,091	11	6,297	556	439	18	23	165	497	99	195	32,983
September.....1938	129	123	6,577	318	2,285	135	8,296	1,513	28	5,296	353	391	252	19	167	303	143	242	26,570
Nine Months.....1939	1,598	1,359	127,774	3,812	40,497	1,167	97,351	25,586	356	48,819	4,789	7,106	817	254	1,712	3,563	1,153	2,386	370,079
Nine Months.....1938	1,229	942	94,193	3,338	28,406	1,071	81,759	15,866	634	42,712	2,981	5,864	2,218	190	1,533	2,987	1,528	2,892	290,343
% Change Nine Months	+30	+44	+36	+14	+42	+9	+19	+61	−44	+14	+61	+21	−63	+34	+12	+19	−24	−17	+28



Wherever trucks travel—

Nation-wide B-K *Service* safeguards



B-K *Reliability*

This is why the majority of Power Braking installations are Bendix B-K

• More than meets all state laws for trucks and trailers • Least weight added • Fewest added parts • Low first cost—Practically no maintenance • Instant remote control • All emergency features of train operation • Quick, easy installation • Original brake system left intact • Fully controlled power application • A nation-wide service organization • Years of power braking experience and unapproached protection over future years of satisfying service.

IT doesn't make any difference whether you're building trucks, selling trucks or operating trucks, the universal service and the universal good reputation of genuine Bendix B-K Power Braking are positively worth good profit dollars to you.

You want power braking on your trucks because it makes them better trucks . . . safer, easier to handle, more efficient. That being the case, you naturally want power braking that gives you *all* the advantages you're paying for.

And *that* means genuine Bendix B-K Controlled Vacuum Power Braking. Not something else, but just that, because it's the *only* power braking that delivers everything you need.

That's why Bendix B-K Power Braking *is* the overwhelming first choice among power brake users; *that's* why it has such universal good reputation; *that's* why so many hundreds of competent, alert, service organizations the nation over and the world around are proud to display the familiar sign of Bendix B-K Service.

BENDIX PRODUCTS DIVISION
OF BENDIX AVIATION CORPORATION
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BENDIX

Controlled Vacuum POWER BRAKING

VACUUM BK POWER BRAKING A BENDIX PRODUCT

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CCJ NEWSCAST

Bart Rawson Commentator

U. S. Says Rails Violate Trust Act

The "war of nerves" between rails and trucks took an interesting turn early last month when the United States Department of Justice filed complaint with the U. S. Court for the District of Columbia charging the Association of American Railroads with violation of the Sherman Anti-Trust Act. Charges were lodged against a resolution passed recently by the railroad association asking member railroads to refuse joint rates and through rates with independent motor carriers. Civil rather than criminal proceedings have been initiated to date.

Court O.K.'s Chicago Rates

Proportional rates filed by a group of Chicago forwarding companies affecting traffic between Chicago and points in Wisconsin, Illinois and Indiana are "O.K.," according to the decision of a three-judge Federal Court sitting in Chicago, early last month. Immediate effect of the decision was a permanent injunction prohibiting enforcement of an I.C.C. order which had commanded the carriers to cancel the rates on the grounds that they were unjustly discriminating in favor of the forwarding companies. The court however decided that such was not the case and that the I.C.C. interpretation of the Act was "erroneous and unlawful."

Car Carriers Ask Dealer Regulation

The national Automobile Transporters Association, Inc., has asked the Interstate Commerce Commission to assume jurisdiction over automobile dealers who transport their own new cars. The petition contends that such operations are carried on at a profit by the dealers, yet are subjected to no regulations save those imposed upon the public at large.

Slide Rule Slip

Our statistical slide rule jack-knifed midway through the November issue, and came up with a pair of sour figures in the "per cent change" column of the New Truck Registrations table. Autocar's eight months' gain should have been 28 per cent, and Brockway's, 47 per cent. Sorry, "A. and B."

Getting Personal

J. G. Moxey, former transportation engineer of the Sun Oil Co., has been named director of public relations for the Automobile Club of Philadelphia, a AAA affiliate. Mr. Moxey will also edit the club's monthly publication, "The Car."

Saunders Jones, former vice-president of The White Co., has been appointed sales manager Whiting Branch, Federated Metals Division of American Smelting and Refining Co., with headquarters at Chicago.

Studebaker Corp. has named H. B. O'Neil

(Turn to Page 46, Please)

TRUCK PRODUCTION
(United States and Canada)

	1939	1938	Per Cent Change
January	64,081	58,062	+10.5
February	63,603	51,464	+24.0
March	77,097	52,106	+48.0
April	68,063	47,818	+42.3
May	63,759	41,575	+53.4
June	66,946	41,857	+60.0
July	62,628	38,336	+63.5
August	40,891	35,259	+16.0
September	27,553	20,174	+36.8
9 Months	534,621	386,651	+38.0

HOW EUREKA TEA CO.
REDUCES ACCIDENTS AND CUTS COSTS

EUREKA TEA COMPANY
CHICAGO, ILL.

September 15, 1939

Hoof Products Company
Chicago, Illinois

Gentlemen:

"Hoof Governors were installed on 40 of our trucks . . . and the great reduction in accidents makes us very happy."

"With this, we have found a substantial improvement in our gasoline mileage."

"Many of our men, learning that the governors were to be installed, objected, but after they had experienced the quick acceleration and evenness of speed . . . their dissatisfaction ceased."

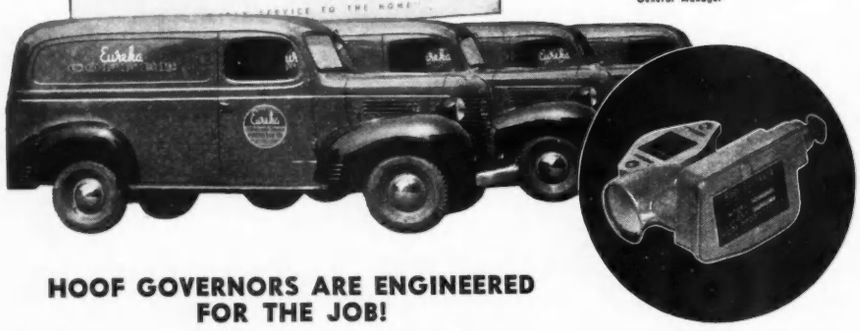
MR. C. E. SWANSON
General Manager

REDUCED ACCIDENTS

MORE MILEAGE

SATISFIED DRIVERS

Another user praises HOOF *Cantilever Spring* GOVERNORS



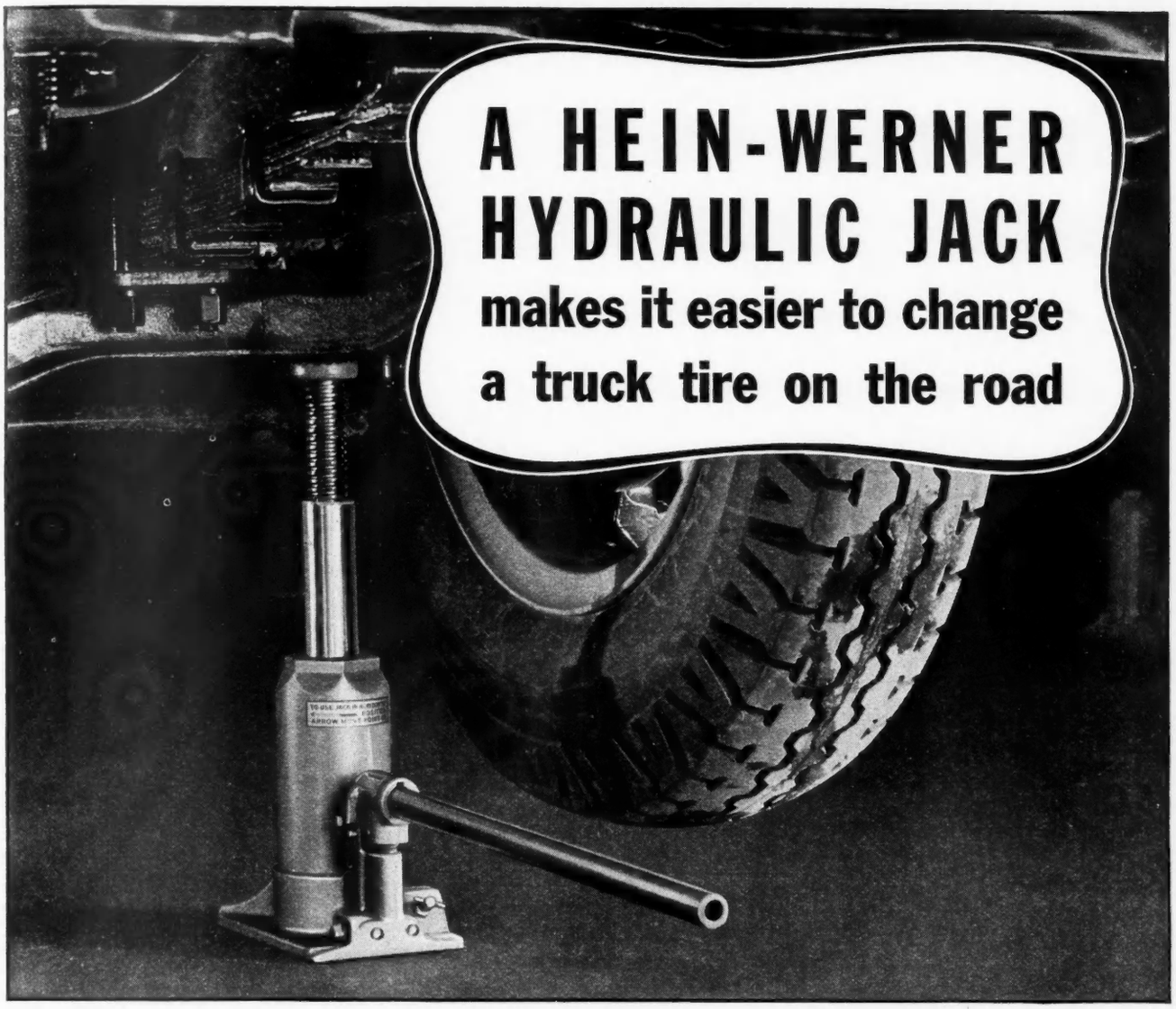
HOOF GOVERNORS ARE ENGINEERED FOR THE JOB!

This safety, economy and satisfaction, of which Mr. Swanson speaks, is not mere chance. You buy a truck for a given job—it must have in-built features to perform a certain duty. It is equally important that your governors are "tailor made" to meet the requirements of your operation and give you the most out of the equipment you have selected. When you buy a Hoof Governor, it's built for YOUR truck and YOUR operation — calibrated to make available every ounce of power the engine will produce . . . engineered to assure economical operation . . . tested on a dynamometer . . . pre-set to the speed you specify . . . No readjustment, no road testing.

HOOF Cantilever Spring GOVERNORS

HOOF PRODUCTS CO., Dept. BEC, 6543 S. Laramie Ave., CHICAGO, ILL.

Makers of the FAMOUS HOOF CANTILEVER GOVERNORS.



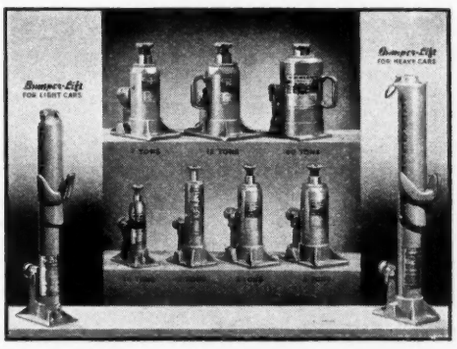
A HEIN-WERNER HYDRAULIC JACK
makes it easier to change a truck tire on the road

BE THRIFTY--equip each of your trucks with a H-W Jack ...All models in this complete line are built right and priced right

IF YOU have ever attempted to change a truck tire on the road, and did not have an easy-operating hydraulic jack—such as a Hein-Werner Hydraulic Jack—you know that it pays to have a good jack handy when one is needed . . . Think of your drivers—and equip your trucks with Hein-Werner Jacks NOW.

Before leaving the factory, all Hein-Werner Hand Jacks are tested at 1½ times their rated capacity. These jacks are compact, powerful and SAFE—in addition to being *built right* and *priced right.*

Complete line includes the "Bumper-Lift" and the "Bullet" 1½ ton capacity jacks for passenger cars . . . Also 2 ton "Light Truck Special" 3, 5, and 8 ton capacity jacks for trucks, and 12 and 20 ton jacks for trucks and buses . . . And a complete line of SERVICE JACKS—1½, 2, 3 and 4 ton capacity.



FEW MODELS ENGINEERED TO DO THE WORK OF MANY
HEIN-WERNER hydraulic JACKS

Ask your jobber or write us for latest prices and details on complete line

HEIN-WERNER MOTOR PARTS CORP.
Waukesha, Wisconsin

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(CONTINUED FROM PAGE 44)

as regional supervisor at Dallas, branch. Grover C. Thompson continues there as regional manager. S. A. Skillman is new regional manager of Buffalo territory and A. J. Wise heads New York area. Six new district sales managers include Charles R. Bowers, St. Paul; George C. Norwood, Cleveland; C. A. Gier, Kansas City; Carl D. Kessler, Memphis; J. L. Greene, Philadelphia, and David R. Neill, Kansas City.

To Lewis H. Brown, president of Johns-Manville Corp., N. Y., was awarded the first Vermilye Medal "in recognition of outstanding contribution in the field of industrial management." Presentation was made by Franklin Institute, Philadelphia.

Carl Behn, who was vice-president of American Bosch Corp. and who died recently after a brief illness.

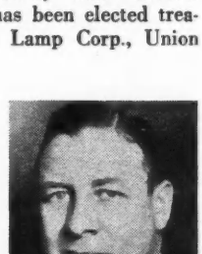
James S. Marvin, general traffic manager of the Automobile Manufacturers Association, will retire from the association staff on Jan. 1 to open his own office at 366 Madison Ave., New York, as consultant on transportation and trade association matters. Kenneth A. Moore, assistant traffic manager, will succeed him at the AMA.

Frank S. Waring, who has been identified with the snow plow business for the past ten years has been appointed sales manager of the Snow Plow Division of the Good Roads Machinery Corp., Kennett Square, Pa.

E. W. Stock, who has been named director of service of the Fruehauf Trailer Co. Mr. Stock for the past eight years has been general service manager of the White Motor Co.

Walter M. Jones, for the past ten years eastern district representative for the Waukesha Motor Co., died suddenly in Pittsburgh, Aug. 31.

Thomas Spina, formerly with National Union Radio Corp., has been elected treasurer of the Carlton Lamp Corp., Union City, N. J.



T. H. Belling, recently named sales manager of Fleming Mfg. Co. (Fram). He has been with Black & Decker for past 17 years

Reo Frame

Unusual is the 1940 Reo frame member pictured on page 45 of our November issue. Instead of being 7⅞ in. deep on the 1½-ton model, as stated, it's really 8⅞ in.

SAE Annual Meeting

Jan. 15-19 has been selected as the date of the 1940 annual meeting of the Society of Automotive Engineers. Including 20 technical sessions, an SAE Engineering exhibit, and the annual dinner are to be held at the Book-Cadillac Hotel, Detroit.

Industrial Notes

To Diamond T goes credit for the first "100,000 mile guarantee," which offers a full warranty on all Diamond T models that is considerably in excess of the average contract. Terms of the contract call for either 100,000 miles or one full year, which ever occurs first.

International Harvester Co. is completing modernization of its proving ground located south of Fort Wayne, Ind. A 1¼-mile concrete oval with banked turns forms the principal part of the equipment, augmented by shorter courses within the oval designed for various torture tests. Included is a stretch of Belgian block, a mud, sand and water bath and an irregular surface to put maximum stress on chassis parts.

Fuel pump and injector production is reported on the up at the Cummins Diesel plant since the department moved into its own new day-light building which forms an addition to the Cummins engine works.

(TURN TO PAGE 93, PLEASE)

DELAYS DELAYS DELAYS!

BUT DON'T *Always* BLAME THE DRIVER

● Truck delays are not always the driver's fault. Perhaps the office is responsible. And *that* discovery leads the way to truly enormous savings.

Here's a truck waiting for its load for 2 *hours*, at a cost of $2 or $3 an hour! Here's a truck with a short afternoon route, getting in at 3:30 and nothing more to do till closing time.

COSTLY DELAYS!

Here's a truck that's up against a hold-up at the freight station, which could be corrected; here's a truck bucking rush hour traffic unnecessarily; here's a truck that needs a helper; here's a truck that's overworked, causing costly overtime!

Time, time, time!

It's all a problem in TIME—and of course the *Servis Recorder* gives you all this information, on its chart, at a glance. It gives you the clue, it points the way to a proper arrangement of your whole truck system, where the driver is only a small part of your problem. Write for free booklet: "Ten Ways of Getting More Work Out of Motor Trucks."

The SERVICE RECORDER Co.
1422 Euclid Ave., Cleveland, O.
Branches in Principal Cities

The Servis Recorder
The Good Driver's Best Friend

COMMERCIAL CAR JOURNAL'S

TRUCK SPECIFICATIONS TABLE of DOMESTIC TRUCK MODELS

BROUGHT UP TO DATE IN THIS ISSUE FROM DATA SUPPLIED BY TRUCK MANUFACTURERS

NOTE: This Table is open to Truck Manufacturers who will supply data accurately, completely and in conformity with the definitions of column headings

KEY TO DEFINITIONS, ABBREVIATIONS AND REFERENCES

DEFINITIONS

MAKE AND MODEL
Only Domestic Truck Models are listed in this Table.

OPTIONAL UNITS
For the express purpose of best fitting the truck to the individual job most of the models listed can be provided with optional engines, transmissions, axles, etc., and these models when so equipped are yet considered standard stock truck models.

CHASSIS LIST PRICE
The chassis list price applies to the minimum standard wheelbase with standard tires and standard equipment. All prices are F.O.B. factory. Chassis list price does not include the price of the Cab unless otherwise noted.

GROSS VEHICLE WEIGHT FOR NORMAL SERVICE
Gross vehicle weights specified are based on normal operating conditions, which permits the manufacturer either to increase or decrease the gross vehicle weight rating when either favorable or unfavorable operating conditions are involved. Gross vehicle weights given are based upon the Maximum Authorized Tire Size listed.

CHASSIS WEIGHT
The chassis weight listed includes the weight of the minimum standard wheelbase chassis, with cowl, with standard tires, with standard equipment, with crankcase and cooling system full, and 5 gallons of fuel in the tank. It does not include the weight of the Cab. This applies to C.O.E. as well as the conventional chassis types.

STANDARD TIRE SIZE
The standard tire size listed is that which is included in the Chassis List Price.

MAXIMUM AUTHORIZED TIRE SIZE
The tire size listed in this column is the maximum size recommended by the manufacturer of the chassis for the Gross Vehicle Weight for Normal Operating Conditions. It is furnished at extra cost, if it differs from the standard size. Dual rears are understood except where otherwise noted.

MINIMUM STANDARD WHEELBASE
The minimum standard wheelbase is the so-called standard wheelbase on which the Chassis List Price is based.

MAXIMUM STANDARD WHEELBASE
The maximum standard wheelbase is the extreme end of the standard range of wheelbases offered by the chassis manufacturer.

MAXIMUM BRAKE HP.
Maximum Brake Horsepower at Given R.P.M. is actual dynamometer reading without accessories.

GEAR RATIO RANGE
Gear Ratio Range in High—Ratios within the range given are available at no extra cost. Exceptions are noted.

TRACTORS
Unless given the designation (N)—meaning not available as a tractor—all standard models may be assumed to be available as tractors. Exclusively Tractor models are designated (T).

KEY TO REFERENCES

c.f.—Cab Forward design.
c.o.e.—Cab-Over-Engine design.
(C)—Converted Ford or Chevrolet model, identifiable by engine make listed.
(d)—Intended for dump or tractor service only.
(D)—Diesel-engine equipped.
e.b.s.—Engine-between-seat design.
e.u.s.—Engine-under-seat design.
(N)—Not available as a tractor.
(T)—Specifically designed for tractor use only.

(1) Autocar—Larger service brake areas on rear axles are provided when tires of 24" base are supplied.

(2) Autocar—Price does not include auxiliary axle. Chassis weight includes auxiliary axle complete; area of brake lining and drum area do not include auxiliary rear axle.

(3) Available—All models available in c.o.e. design.

(4) Chevrolet—Governor set not to exceed 45 M.P.H.

(5) Condor—These models available with double drop bus frames.

(6) Federal—263 cu. in. engine and 11" clutch available on Models 15 and 75. 404 cu. in. and 428 cu. in. engines available on Model 40. 428 cu. in. engine available on Models 50 and 50H. Oversize or two-speed rear axles available on Models 15, 18, 20, 25, 29, 29H, 40, 75, 80, 85, 89 and 89H. Double reduction rear axles available on Models 20, 25, 29, 29H, 40, 80, 85, 89 and 89H. Two or three-speed auxiliary transmissions available on all models. All above equipment furnished at extra cost.

(7) Federal—Models 29H and 89H when furnished with fishplates, radius rods and 9.75/20 tires are known as 29XH and 89XH and have gross rating of 25,000 lbs.

(9) Gramm—Models 31, 41, 46, 56, 71, 76, 86 and 96 both gasoline and diesel available with double drop bus frames of various wheelbases. 221 cu. in. engine available on Model 21. 263 cu. in. engine available on Models 31 and 41. 282 cu. in. engine and 5 speed transmission available on Models 41, 46, and 56. 320 cu. in. engine and 5 speed transmission available on Models 41, 46, 56, and 71. 404 cu. in. engine and larger 5 speed transmission available on Model 86. Oversize two speed and double reduction axles available on Models 21, 31, 41, 46, 56, 71, 76 and 86 both gasoline and diesel. All other equipment furnished at extra cost.

(10) Corbitt—Wheelbases optional—any wheelbase desired furnished at chassis price listed.

(11) International Harvester—By "Normal operating conditions" (see definition of Gross Vehicle Weight for Normal Service) is meant operation on comparatively level terrain, over roads with a tractive resistance value of from 25 to 30 pounds per ton of gross vehicle weight and at controlled and uniform speeds within a range of not to exceed 45 m.p.h.

(14) Reo—Also available with four speed transmission and bevel gear rear axle.

(15) Sterling—Available with double reduction rear axle.

(16) Sterling—Diesel powered unit of comparable capacity available in addition to gasoline models.

(18) Willys—Advertised list price less Federal tax. Cab Pick-up $525; Cab Stake $545; Panel Delivery $799. Prices, complete with shock absorbers and front and rear bumpers. Standard tires 5.50/16—4 ply; Panel Delivery 6.00/16—4 ply; 6.00/16S—6 ply—optional.

Key to Abbreviations

MAKES—ALL

B—Bendix.
BL—Brown-Lipe.
Bu or Bud—Buda.
Cat—Caterpillar.
Cl or Cla—Clark.
C or Chev—Chevrolet.
Co—Covert.
Con—Continental.
Col—Columbia.
Cum—Cummins-Diesel.
Eat—Eaton.
Fu—Fuller.
F—Ford.
Her—Hercules.
L—Lockheed.
LO—Lockheed front, Own rear.
LW—Lockheed front, Wisconsin rear.
Lyc—Lycoming.
N.P.—New Process.
O or Ow—Own.
Op or Opt—Optional.
Sal—Salisbury.
Shu—Shuler.
Spi—Spicer.
T or Tim—Timken.
TO—Timken front, Own rear.
TW—Timken-Wisconsin.
TWH—Timken Wisconsin Herrington.
WG—Warner Gear.
WH—Wisconsin Herrington.
W-Hes—Waukesha Hesselman.
Wau—Waukesha.
W or Wis—Wisconsin.
WO—Wagner front, Own rear.
Ws—Westinghouse.

BRAKES—SERVICE

Location

2—Two Wheels, rear only.
4—Four Wheels, front and rear.
4r—Four Wheels, rear only.
6—Six Wheels, front and rear.

Type

I—Internal.
X—External.

Operation

A—Air.
D—Hydraulic and mechanical.
H—Hydraulic.
M—Mechanical.
V—Vacuum.

BRAKES—HAND

Location

C—Center of double propeller shaft.
2—Rear wheels.
2/4—Two-wheel brakes effective on all four wheels through driveshaft.
4—Four wheels.
6—Six wheels.
J—Jackshaft.
T—Transmission.
F—Driveshaft.
P—Propeller shaft.

Type

D—Tru-Stop disk.
I—Internal.
X—External.

BRAKE DRUMS

Material

a—Cast alloy iron.
A—American Car Foundry.
c—Cast iron.
C—Centrifuse.
Cl—Copper iron.
D—Dayton.
E—Ermalite.
F—Furnace iron.
G—Gunite.
N—Nickel iron.
p—Pressed steel.
P—Pressed steel.
s—Cast steel.

(Where a combination of any of the above is used, the first reference mark applies to the front and the second to the rear drums.)

FRAME

Type

I—"I" Beam.
C—Channel.
T—Channel tapered front and rear.
I—Channel reinforced with liner.
B—Channel reinforced with both liner and fishplate.
P—Channel reinforced with plate.
TL—Channel tapered front and rear reinforced with liner.
D—Drop Center
Tf—Tapered front.
X—x-Braced.

GOVERNOR STANDARD

Y—Yes.
N—No.

REAR AXLE

Final Drive and Type

B—Bevel.
C—Chain.
D—Dead.
F—Full-floating.
Hy—Hypoid.
d—Dual range axle.
2—Double Reduction.
S—Spiral bevel.
W—Worm.
½—Semi-floating.
¾—Three-quarter floating.

Gear Ratios

(*)Ratios other than standard at extra cost.
(**) Only one ratio.

Drive and Torque

A—Radius Rods and Torque Arm.
H—Hotchkiss (springs).
R—Radius Rods.
T—Torque Arm.
U—Torque Tube.

WHEELS DRIVEN

2F—Forward unit of Rear Axle Group.
2R—Rear Unit of Rear Axle Group.
4R—Forward and rear units of Rear Axle Group.
4F—Front Axle and Forward unit of Rear Axle Group.
4FR—Front Axle and Rear unit of Rear Axle Group.
6—All wheels.

Line Number	MAKE AND MODEL	Chassis List Price	WHEEL-BASE Minimum Standard	WHEEL-BASE Maximum Standard	Gross Vehicle Weight for Normal Service	Chassis Weight (See definition)	TIRE SIZES D-dual rear S-single rear Standard Front and Rear	TIRE SIZES Maximum Authorized Tire Size	ENGINE DETAILS Make and Model	No. of Cylinders, Bore and Stroke	Displacement	Comp. Ratio	Torque lb. ft.	Max. Brake H.P. at R.P.M. Given	Main Bearings Number, Diameter and Length	Governor Standard	TRANSMISSION Make and Model	TRANSMISSION Forward Sp'ds	REAR AXLE Make and Model	REAR AXLE Gear and Type	REAR AXLE Drive & Torque	REAR AXLE Gear Ratio Range in High	FRONT AXLE Make and Model	BRAKES SERVICE Make Location Type Operat'n	BRAKES SERVICE Lining Area	BRAKES SERVICE Drum Area	BRAKES SERVICE Drum Material	BRAKES Hand Location Type	C-A Dimension (Min. Std. W. B.)	FRAME Side Rail Dimensions	FRAME Type
1	Autocar(1) C-10	1250	139	179	13500	4820	6.50/20D	8.25/20	Her JXB	6–3½x4¼	263	5.8	184	73–2300	7–2½x10‡‡	Y	Cla 185F	4	Tim 54412	SF	H	5.83–6.8	Tim 31013	L4IHV	308	470	c	TD	62½	8x2¾x¼	T
2	.....(D) DC-10	2550	139	179	13500	4955	6.50/20D	8.25/20	Her DJXB	6–3½x4½	260	15.	178	77–2600	7–3x10	Y	Cla 185F	4	Tim 54412	SF	H	5.83–6.8	Tim 31013	L4IHV	308	470	c	TD	62½	8x2¾x¼	T
3	.....C-20	1625	139	179	16000	5180	6.50/20D	9.00/20	Her JXC	6–3¼x4¼	282	5.8	197	78–2300	7–2½x10‡‡	Y	Cla 200VO	5	Tim 56410	SF	H	6.16–7.4	Tim 31015	L4IHV	358	578	c	TD	62½	8x2¾x¼	T
4	.....(D) DC-20	2925	139	179	16000	5315	6.50/20D	9.00/20	Her DJXC	6–3¼x4½	298	15.	208	83–2600	7–3x10	Y	Cla 200VO	5	Tim 56410	SF	H	6.16–7.4	Tim 31015	L4IHV	358	578	c	TD	62½	8x2¾x¼	T
5	.....C-30	2150	142	200	18500	5440	7.00/20D	9.00/20	Own 315	6–3¾x4¾	315	5.5	220	81–2400	7–3x12⅝	Y	Cla 200VO	5	Tim 56400	SF	H	6.16–7.4	Tim 32502	L4IHV	402	659	c	TD	62	9x3x¼	T
6	.....(N) C-40	2850	164	200	20000	6920	8.25/20D	9.00/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own RL5	5	Own RC	2F	H	6.49–7.89	Tim 32502	LO4IDV	466	694	c	2I	84	9x3x¼	T
7	.....(T) C-40-T	3000	142	164	32000	7090	8.25/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own RL5	5	Own DB	2F	H	6.49–7.13	Tim 32502	LO4IDV	466	694	c	2I	62	9x3x¼	T
8	.....(d) C-40-D	3100	148	164	20000	7320	8.25/20D	9.00/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own RL5	5	Own DB	2F	H	6.49–7.13	Tim 35000	LO4IDV	466	694	c	2I	74	9x3x¼	T
9	.....(N) C-50	3125	164	200	25000	7205	9.00/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own RL5	5	Own DF	2F	H	6.49–7.13	Tim 35000	LO4IDV	466	694	c	2I	84	9x3x¼	T
10	.....(d) C-50-D	3325	154	164	22000	7840	9.00/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Fu 5A43	5	Own DB	2F	H	7.85–8.57	Tim 35000	LO4IDV	567	831	c	2I	74	9x3x¼	T
11	.....(N) C-60	3600	164	200	26000	8210	9.00/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own DF5	5	Own DB	2F	H	6.49–7.89	Tim 35000	LO4IDV	466	694	c	2I	84	9x3x¼	T
12	.....(T) C-60-T	4100	148	164	36000	8260	9.00/20D	9.75/20	Own 408	6–4¼x5¼	408	5.5	295	110–2400	7–3½x13.76	Y	Own DF5	5	Own TF	2F	H	7.20–8.57	Tim 32502	LO4IDV	567	831	c	2I	68	9x3x¼	T
13	.....(N) C-70	4500	148	200	28000	8670	9.75/20D	10.50/20	Own 408	6–4¼x5¼	408	5.5	295	110–2400	7–3½x13.76	Y	Own DF5	5	Own TF	2F	H	7.20–8.57	Tim 35100	LO4IDV	580	930	c	FD	84	9x3x¼	T
14	.....(T) C-70-T	4600	148	164	40000	8350	9.00/20D	10.50/20	Own 447	6–4¼x5¼	447	5.5	333	116–2400	7–3½x13.76	Y	Own DF5	5	Own TF	2F	H	7.20–8.57	Tim 32502	LO4IDV	567	831	c	FD	68	9x3x¼	T
15	.....(N) C-80	5100	164	200	30000	9790	10.50/20D	10.50/24	Own 447	6–4¼x5¼	447	5.5	333	116–2400	7–3½x13.76	Y	Own TF5	5	Own TG	2F	H	7.20–8.68	Tim 35100	LO4IDV	580	930	c	FD	84	10⅜x3x¼	T
16	.....(T) C-80-T	4900	148	164	45000	9320	9.75/20D	10.50/20	Own 447	6–4¼x5¼	447	5.5	333	116–2400	7–3½x13.76	Y	Own TF5	5	Own TG	2F	H	7.20–8.68	Tim 35000	LO4IDV	567	831	c	FD	68	9x3x¼	T
17	.....(d) C-80-D	5750	170	170	30000	10080	10.50/20D	10.50/24	Own 447	6–4¼x5¼	447	5.5	333	116–2400	7–3½x13.76	Y	owTF4:A3	12	Own CGA	2F	H	7.69–8.52	Tim 26452	LO4IDV	580	930	c	FD	90	10½x3x⅞	T
18	.....(N) C-90	5850	182	200	36000	10540	10.50/20D	11.25/20	Own 501	6–4½x5¼	501	5.5	375	127–2300	7–3½x13.76	Y	Own TF5	5	Own TG	2F	H	7.20–8.68	Tim 26452	TO4IA	631	930	c	FD	102	10⅜x3x¼	T
19	.....(T) C-90-T	5700	148	164	50000	9710	10.50/20D	11.25/20	Own 501	6–4½x5¼	501	5.5	375	127–2300	7–3½x13.76	Y	Own TF5	5	Own TG	2F	H	7.20–8.68	Tim 35100	TO4IA	631	930	c	FD	68	9x3x¼	T
20	(T)(D) DC-100-T	8100	144	174	60000	11795	9.75/20D	11.25/24	Cum HB6	6–4⅞x6	672	17.	500	150–1800	7–4½x16½	Y	BL7341:A3	12	Own GD	2F	H	4.4 –6.97	Tim 27452	TO4IA	631	930	a	D	70	10⅜x3x¼	L
21	(d)(D) DC-100-D	9500	158	158	54000	13325	11.25/24D	13.50/24	Cum HB6	6–4⅞x6	672	17.	500	150–1800	7–4½x16½	Y	BL7341:A3	12	Tim 79742W	2F	R	6.32–7.33	Tim 27452	TW4IA	739	1050	a	D	84	10½x3x⅞	L
22	.....(d) C-90-D	6650	170	170	44000	11440	10.50/24D	13.50/24	Own 501	6–4½x5¼	501	5.5	375	127–2300	7–3½x13.76	Y	owTF4:A3	12	T-W 79742-W	2F	R	9.3–10.1	Tim 27452	TW4IA	739	1050	c	FD	90	10½x3x⅞	T
23	.....(N) NFS	5600	195	195	26000	10380	10.50/20D	10.50/20	Own 408	6–4¼x5¼	408	5.5	295	110–2400	7–3½x13.76	Y	Own DF5	5	Own TF	2F	H	7.20–8.57	Tim 26452	LO4IDV	580	930	c	FD	119½	9x3x¼	T
24	.....(N) TS	6600	204	204	29740	11404	10.50/24D	10.50/24	Own 447	6–4¼x5¼	447	5.5	333	116–2400	7–3½x13.76	Y	Own TF4	4	Own TG	2F	H	7.20–8.68	Tim 26452	TO4IA	739	1050	c	FD	129	10½x3x⅞	T
25	c.o.e. U-10	1350	84	142	13500	4560	6.50/20D	8.25/20	Her JXB	6–3¼x4¼	263	5.8	184	73–2300	7–2½x10‡‡	Y	Cla 185F	4	Tim 54412	SF	H	5.83–6.8	Tim 31015	L4IHV	328	528	c	TD	62	8x2¾x¼	T
26	c.o.e. U-20	1725	84	142	16000	5130	6.50/20D	9.00/20	Her JXC	6–3¾x4¼	282	5.8	197	78–2300	7–2½x10‡‡	Y	Cla 200VO	5	Tim 56410	SF	H	6.16–7.4	Tim 32502	L4IHV	358	578	c	TD	62	8x2¾x¼	T
27	c.o.e. U-30	2300	96	142	18500	6270	7.00/20D	9.00/20	Own 315	6–3⅜x4¾	315	5.5	220	81–2400	7–3x12⅝	Y	Cla 200VO	5	Tim 56400	SF	H	6.16–7.4	Tim 35000	L4IHV	402	659	c	TD	74	9x3x¼	T
28	c.o.e. (N) U-40	3050	106	142	20000	6910	8.25/20D	9.00/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own URL5	5	Own RC	2F	H	6.49–7.89	Tim 35000	LO4IDV	466	694	c	2I	84	9x3x¼	T
29	c.o.e. (T) U-40-T	3200	96	106	32000	7170	8.25/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own URL5	5	Own DB	2F	H	6.49–7.89	Tim 35000	LO4IDV	466	694	c	2I	74	9x3x¼	T
30	c.o.e. (d) U-40-D	3300	96	96	20000	7070	8.25/20D	9.00/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own URL5	5	Own DB	2F	H	6.49–7.89	Tim 35000	LO4IDV	466	694	c	2I	74	9x3x¼	T
31	c.o.e. (N) U-50	3435	106	142	25000	7440	9.00/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own URL5	5	Own DB	2F	H	6.49–7.89	Tim 35000	LO4IDV	466	694	c	2I	84	9x3x¼	T
32	e.u.s. (N) U-60	3800	109	145	26000	8450	9.00/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own UDF5	5	Own DB	2F	H	6.49–7.89	Tim 35100	LO4IDV	479	793	c	2I	84¼	8x3x¼	T
33	e.u.s. (T) U-60-T	4500	98	109	36000	8860	9.00/20D	9.75/20	Own 408	6–4¼x5¼	408	5.5	295	110–2400	7–3½x13.76	Y	Own UDF5	5	Own C	2F	H	7.85–8.57	Tim 35000	LO4IDV	567	831	c	2I	73¼	8x3x¼	T
34	e.u.s. (d) U-60-D	4400	100	100	26000	8880	9.00/20D	9.75/20	Own 358	6–4x4¾	358	5.5	250	89–2400	7–3x12⅝	Y	Own UDF5	5	Own C	2F	H	7.85–8.57	Tim 26452	LO4IDV	580	930	c	2I	75¼	8x3x¼	T
35	e.u.s. (N) U-70	5000	109	163	28000	8770	9.75/20D	10.50/20	Own 408	6–4¼x5¼	408	5.5	295	110–2400	7–3½x13.76	Y	Own UDF5	5	Own C	2F	H	7.2 –8.57	Tim 26452	LO4IDV	580	930	c	FD	84¼	8x3x¼	T
36	e.u.s. (T) U-70-T	5000	98	109	40000	8880	9.00/20D	10.50/20	Own 447	6–4¼x5¼	447	5.5	333	116–2400	7–3½x13.76	Y	Own UDF5	5	Own C	2F	H	7.2 –8.57	Tim 35000	LO4IDV	567	831	c	FD	73¼	8x3x¼	T
37	e.u.s. (N) U-80	5400	128	163	30000	10250	10.50/20D	10.50/24	Own 447	6–4¼x5¼	447	5.5	333	116–2400	7–3½x13.76	Y	Own UTF5	5	Own TG	2F	H	7.2 –8.68	Tim 26452	LO4IDV	631	930	c	FD	103¼	9x3x¼	T
38	e.u.s. (T) U-80-T	5450	98	109	45000	9970	9.75/20D	10.50/20	Own 447	6–4¼x5¼	447	5.5	333	116–2400	7–3½x13.76	Y	Own UTF5	5	Own CG	2F	H	7.69–8.52	Tim 26452	LO4IDV	580	930	c	FD	73¼	8x3x¼	T
39	e.u.s. (d) U-80-D	5850	109	120	30000	10550	10.50/20D	10.50/24	Own 447	6–4¼x5¼	447	5.5	333	116–2400	7–3½x13.76	Y	Fu 5A62	5	Own CGA	2F	H	7.69–8.52	Tim 26452	LO4IDV	631	930	c	2I	84¼	9x3x¼	T
40	e.u.s. (N) U-90	6000	128	163	36000	10910	10.50/20D	11.25/20	Own 501	6–4½x5¼	501	5.5	375	127–2300	7–3½x13.76	Y	Own UTF5	5	Own TG	2F	H	7.20–8.68	Tim 26452	TO4IA	631	930	c	FD	103¼	9x3x¼	T
41	e.u.s. (T) U-90-T	6000	98	109	50000	10260	10.50/20D	11.25/20	Own 501	6–4½x5¼	501	5.5	375	127–2300	7–3½x13.76	Y	Own UTF5	5	Own CG	2F	H	7.69–8.52	Tim 26452	TO4IA	631	930	c	FD	73¼	9x3x¼	T
42	e.u.s. (d) U-90-D	6850	109	120	44000	12400	10.50/24D	11.25/24	Own 501	6–4½x5¼	501	5.5	375	127–2300	7–3½x13.76	Y	Fu 5A62	5	Tim 79742-W	2F	R	8.59–10.1	Tim 27452	TW4IA	739	1050	c	2I	84¼	10½x3x⅞	T
43	e.u.s. (N) UNFS	5600	145	145	27000	9585	10.50/20D	10.50/20	Own 408	6–4¼x5¼	408	5.5	295	110–2400	7–3½x13.76	Y	Own UDF4	4	Own TF	2F	H	7.20–8.57	Tim 26452	LO4IDV	637	930	c	FD	120¼	9x3x¼	P
44	e.u.s. (N) UTS	6600	145	145	29900	10927	10.50/24D	10.50/24	Own 447	6–4¼x5¼	447	5.5	333	116–2400	7–3½x13.76	Y	Own UTF4	4	Own TG	2F	H	7.20–8.68	Tim 26452	TO4IA	631	930	c	FD	120¼	10½x3x⅞	P
45	Avail- (3) P-105	1035	96	140	5500	2425	6.00/18S	6.50/18	Wau FC	4–3¼x4	133	5.6	93	36–2800	3–2¼x3‡‡	N	WG T9	4	Tim 53508	SF	H	**–6.6	Tim 30000H	L4IH	266	388	a	TX	48	4x2x¼	T
46	able.....X-110	1370	138	176	11700	3900	6.50/20D	7.00/20	Wau ZKA	6–3⅜x4½	221	5.6	154	66–2900	4–2⅜x5⅝	N	WG T9	4	Tim 53508	SF	H	**–6.6	Tim 30000H	L4IH	266	388	a	TX	60	8x3x¼	T
47	.....X-120	1520	138	172	13200	4100	7.00/20D	7.50/20	Wau ZKA	6–3⅜x4½	221	5.6	154	66–2900	4–2⅜x5⅝	N	WG T9	4	Tim 53308	SF	H	**–6.6	Tim 30000H	L4IH	304	477	a	TX	60	10x3x¼	T
48	.....X-140	1600	138	172	13200	4300	7.00/20D	7.50/20	Wau BL	6–3½x4¾	245	5.7	165	73–3000	7–2⅝x10¼	N	WG T9	4	Tim 53308	SF	H	**–6.6	Tim 31000H	L4IH	300	552	a	TX	60	10x3x¼	T
49	.....X-170	1795	138	172	15900	4800	7.50/20D	8.25/20	Wau BM	6–3⅝x4¾	263	5.7	178	78–3100	7–2⅝x10¼	N	WG T9	4	Tim 54411	SF	H	**–6.8	Tim 31000H	L4IH	328	603	a	TX	60	10x3x¼	T
50	.....X-220	1905	138	172	15900	4900	7.50/20D	8.25/20	Wau BK	6–3¾x4¾	282	5.7	188	85–3200	7–2⅝x10¼	N	WG T9A	4	Tim 54411	SF	H	**–6.8	Tim 32502H	L4IH	328	603	a	TX	60	10x3x¼	T
51	.....X-250	2240	138	196	19500	5500	8.25/20D	9.00/20	Wau BZ	6–4x4¼	320	5.7	210	86–2800	7–2⅝x10¼	Y	Fu 5A330	5	Tim 56410	SF	R	**–7.4	Tim 32502H	L4IH	328	603	a	TX	60	12x3x¼	T
52	.....X-280	2440	138	196	23400	6100	9.00/20D	9.75/20	Wau BZ	6–4x4¼	320	5.7	210	86–2800	7–2⅝x10¼	Y	Fu 5A330	5	Tim 58305	SF	R	**–7.8	Tim 33000A	L4IH	370	684	a	TX	60	12x3x¼	T
53	.....X-310	2880	142	196	23400	6800	9.00/20D	9.75/20	Wau MKR	6–4⅜x5½	381	5.3	270	99–2400	7–2½x12½	Y	Fu 5-A-430	5	Tim 58305	SF	R	**–7.8	Tim 35000H	L4IH	370	684	a	TX	60	12x3x¼	T
54	.....X-410	3800	142	196	23400	8000	9.75/20D	9.75/20	Wau SRLR	6–4⅜x5½	462	5.5	330	112–2300	7–3x13¾	Y	Fu 5-A-620	5	Tim 65725H	WF	R	**–8.50	Tim 35000H	L4IH	462	793	a	TD	60	12x3x¼	T
55	Bantam.....	349	75	75	1700	850	4.00/15S	5.00/15	Own	4–2.26x3	50	7.4	341	22–3800	2–2½x‡‡	N	WG T48E	3	Spi 10	8	H	**–5.87	Spi 10	O4IM	76	104	P	4I	114	8x2⅄x.109	....
56	Brockway.....78	895	138	164	13000	3965	6.00/20D	32x6	Con 24B	6–3⅄x4½	210	5.7	154	71–3100	4–2¼x6	N	WG T9	4	Tim 53521H	SF	H	5.66–6.6	Tim 30000H	L4IH	255	402	a	TX	65⅄	7‡‡x3x⅄	T
57	83	1195	138	176	14000	4100	6.50/20D	7.50/20	Con 25B	6–3⅓x4⅝	244	5.4	171	84–3250	4–2⅝x6⅝	N	WG T9	4	Tim 53521H	SF	H	5.66–6.6	Tim 30000H	L4IHV	255	402	a	TX	65⅄	7‡‡x3x⅄	T
58	88	1290	150	176	15000	4500	6.50/20D	7.50/20	Con 25B	6–3⅓x4⅝	244	5.4	171	84–3250	4–2⅝x6⅝	N	WG T9	4	Tim 53307H	SF	H	6.2 –6.8	Tim 30000H	L4IHV	298	477	a	TX	71⅄	7‡‡x3x⅄	T
59	92	1560	150	188	16000	4700	7.00/20D	8.25/20	Con 25B	6–3⅓x4⅝	244	5.4	171	84–3250	4–2⅝x6⅝	N	WG T9	4	Tim 54411H	SF	H	5.83–6.8	Tim 31000H	L4IHV	329	580	a	CD	83⅄	8x3x¼	T
60	94	1850	156	188	18500	5050	7.50/20D	8.25/20	Con 25B	6–3⅓x4⅝	244	5.4	171	84–3250	4–2⅝x6⅝	N	BL B341	4	Tim 56410H	SF	H	6.16–7.4	Tim 31000H	L4IHV	329	580	a	CD	83⅄	8x3x¼	T
61	96	1740	156	176	15000	5150	7.00/20D	8.25/20	Con 29B	6–3‡‡x4½	288	5.4	192	78–2650	7–2⅝x13	N	BL B341	4	Tim 53307H	SF	H	5.83–6.8	Tim 31000H	L4IHV	302	528	a	CD	83⅄	7‡‡x3x⅄	T
62	110	1900	156	188	18000	5490	7.50/20D	8.25/20	Con 29B	6–3‡‡x4½	288	5.4	192	78–2650	7–2⅝x13	N	BL B341	4	Tim 54411H	SF	H	5.83–6.8	Tim 31000H	L4IHV	329	580	a	CD	83⅄	8x3x¼	T
63	112	1710	150	188	18000	5150	7.00/20D	8.25/20	Con 38B	6–3¾x4¾	290	5.6	205	87–2800	7–2¾x12	N	BL B341	4	Tim 54411H	SF	H	5.83–6.8	Tim 31000H	L4IHV	329	580	a	CD	77⅄	8x3x¼	T
64	.....125X	2075	164	188	18000	5570	7.50/20D	8.25/20	Con 31B	6–3⅝x4½	318	5.5	214	86–2600	7–2⅝x13	N	BL B341	4	Tim 54411H	SF	H	5.83–6.8	Tim 31000H	L4IHV	329	580	a	CD	91⅄	8x3x¼	T
65	128	1950	156	188	20000	5550	7.50/20D	8.25/20	Con 38B	6–3¾x4¾	290	5.6	205	87–2800	7–2¾x12	N	BL B341	4	Tim 56410H	SF	H	5.71–7.4	Tim 31000H	L4IHV	329	580	a	CD	83⅄	8x3x¼	T
66	130	2245	164	206	20000	6270	8.25/20D	9.00/20	Con 29B	6–3‡‡x4½	288	5.4	192	78–2650	7–2⅝x13	N	BL B341	4	Tim 56410H	SF	R	6.16–7.4	Tim 32505H	L4IHV	329	580	a	CD	91⅄	8x3x¼	T
67	145	2385	176	206	20000	6390	8.25/20D	9.00/20	Con 31B	6–3⅝x4½	318	5.5	214	86–2600	7–2⅝x13	N	BL B341	4	Tim 56410H	SF	R	6.16–7.4	Tim 32505H	L4IHV	329	580	a	CD	103⅄	8x3x¼	T
68	.....150X-4	2680	176	206	22000	6520	8.25/20D	9.00/20	Con 32B	6–4¼x4½	361	5.4	252	95–2500	7–2⅝x13	Y	BL 3241	4	Tim 56410H	SF	R	5.71–7.4	Tim 32505H	L4IHV	329	580	a	CD	103⅄	8x3x¼	T
69	.....150X-5	2710	176	206	22000	6570	8.25/20D	9.00/20	Con 32B	6–4¼x4½	361	5.4	252	95–2500	7–2⅝x13	Y	Fu 5-A-43	5	Tim 56410H	SF	R	5.71–7.4	Tim 32505H	L4IHV	329	580	a	CD	103⅄	8x3x¼	T
70	.....130-P8	2525	164	206	20000	6250	34x7D	9.00/20	Con 29-B	6–3‡‡x4½	288	5.4	192	78–2650	7–2⅝x13	N	Fu 5-A-43	5	Tim 56410H	SF	R	6.16–7.4	Tim 32505H	L4IHV	329	580	a	CD	91⅄	8x3x¼	B
71	.....160X	3295	153	219	25000	7350	9.00/20D	9.75/22	Con 32B	6–4¼x4½	361	5.4	252	95–2500	7–2⅝x13	Y	Fu 5-A-43	5	Tim 58205H	SF	R	6.14–7.8	Shu 15785B	L4IHV	396	663	a	CD	83⅄	8½x3x⅄	T
72	.....170X	3640	153	219	25000	7960	9.00/20D	9.75/22	Con 33B	6–4¼x4¾	381	4.7	276	106–2600	7–2¾x13⅄	Y	Fu 5-A-62	5	Tim 72300H	2F	R	5.78–7.35	Shu 15785B	L4IHV	396	663	a	CD	83⅄	8½x3x⅄	T
73	.....165X	3795	153	219	28000	8150	9.75/20D	10.50/22	Con 32B	6–4¼x4½	361	5.4	252	95–2500	7–2⅝x13	Y	Fu 5-A-43	5	Wis 1337BH	2F	R	5.63–8.59	Shu 15785B	L4IHV	484	772	a	CD	83⅄	8½x3x⅄	T
74	.....175X	4290	153	219	30000	8550	9.00/20D	10.50/22	Con 34B	6–4⅜x4¾	427	4.6	308	118–2600	7–2¾x13⅄	Y	Fu 5-A-62	5	Wis 1337BH	2F	R	5 63–8.59	Shu 15785B	L4IHV	484	772	a	CD	83⅄	8½x3x⅄	T
75	.....195X	4230	153	219	28000	8650	9.75/20D	10.50/22	Con 33B	6–4¼x4¾	381	4.7	276	106–2600	7–2¾x13⅄	Y	Fu 5-A-62	5	Wis 1337BH	2F	R	5.63–8.59	Shu 15785B	L4IHV	484	772	a	CD	83⅄	8½x3x⅄	T
76	.....220X	4930	153	219	34000	9050	10.50/20D	11.25/24	Con 34B	6–4⅜x4¾	427	4.6	308	118–2600	7–2¾x13⅄	Y	Fu 5-A-62	5	Wis 1757R	2F	R	6.06–8.82	Shu 15795B	L4IHV	536	899	a	CD	83⅄	8½x3x⅄	T
77	.....240X	5130	153	219	30000	8590	9.75/20D	10.50/24	Con 35B	6–4½x5¼	501	4.5	364	135–2200	7–2¾x13⅄	Y	Fu 5-A-62	5	Wis 1337BH	2F	R	5.63–7.52	Shu 15785B	L4IHV	484	772	a	CD	83⅄	8½x3x⅄	T
78	.....260X	6030	195	219	34000	9720	10.5/22D	11.25/24	Con 35B	6–4½x5¼	501	4.5	364	135–2200	7–2¾x13⅄	Y	Fu MHU	4	Wis 1757H	2F	R	6.06–8.82	Shu 15795B	L4IHV	536	899	a	CD	125⅄	8½x3x⅄	T
79	.....260S	6380	195	219	36000	10000	10.50/24D	11.25/24	Con 35B	6–4½x5¼	501	4.5	364	135–2200	7–2¾x13⅄	Y	Fu MHU	4	Wis 1757H	2F	R	6.06–8.82	Shu 15795B	Lw4IDV	600	899	a	CD	125⅄	8½x3x⅄	B
80	Chev- (x) Mas. KC	450	113	113	4600	2255	6.00/16S	15–6	Own	6–3½x3¾	216	6.2	168	78–3200	4–2¾x5⅄	N	Own	3	Own	Hy	U	**–4.11	Own	O4IH	158	288	a	2I	38¼	5¾x2¼x⅄	C
81	....(x) Mas. KD	528	123	123	5200	2415	15–6S	15–6	Own	6–3½x3¾	216	6.2	168	78–3200	4–2¾x5⅄	N	Own	3	Own	Hy	U	**–4.55	Own	O4IH	158	288	a	2I	48½	5‡‡x2¼x⅄	C
82	....(x) Mas. WA	558	133	133	6700	3000	6.00/20S	6.00/20S	Own	6–3½x3¾	216	6.2	168	78–3200	4–2¾x5⅄	N	Own	4	Own	HyF	U	5.43–6.17	Own	O4IH	330	532	P	2I	57¾	7x2¾x⅄	C
83	...▲(x) Mas. WA	569	133	133	7700	3060	6.00/20S‡	32x6S‡	Own	6–3½x3¾	216	6.2	168	78–3200	4–2¾x5⅄	N	Own	4	Own	HyF	U	5.43–6.17	Own	O4IH	330	532	P	2I	57¾	7x2¾x⅄	C
84	...●(x) Mas. WA	590	133	133	9500	3200	6.00/20D	32x6–10p	Own

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Line Number	MAKE AND MODEL	Chassis List Price	WHEEL-BASE Minimum Standard	WHEEL-BASE Maximum Standard	Gross Vehicle Weight for Normal Service	Chassis Weight (See definition)	TIRE SIZES D-dual rear S-single rear: Standard Front and Rear	TIRE SIZES: Maximum Authorized Tire Size	ENGINE DETAILS: Make and Model	No. of Cylinders, Bore and Stroke	Displacement	Comp. Ratio	Torque lb. ft.	Max. Brake H.P. at R.P.M. Given	Main Bearings: Number, Diameter and Length	Governor Standard	TRANSMISSION: Make and Model	TRANSMISSION: Forward Spd's	REAR AXLE: Make and Model	REAR AXLE: Gear and Type	REAR AXLE: Drive & Torque	REAR AXLE: Gear Ratio Range in High	FRONT AXLE: Make and Model	BRAKES SERVICE: Make Location Type Operat'n	BRAKES SERVICE: Lining Area	BRAKES SERVICE: Drum Area	BRAKES SERVICE: Drum Material	BRAKES: Hand Location Type	C-A Dimension (Min. Std. W. B.)	FRAME: Side Rail Dimensions	FRAME: Type
	Federal (Cont.)																														
1	(6)....(c.o.e.) 75	930	104	215	14000	3930	6.00/20†S	8.25/20	Her JXAF	6-3⅜x4½	228	5.9	175	72-3000	7-2½x10	Y	WG T9	4	Tim 53308H	SF	H	5.14-6.66	Tim 31100H	L4IH	299	478	a	TX	60	8x2¾x¼	TTTTT
2	(6)....(c.o.e.) 80	1260	104	215	19000	5240	7.00/20D	9.00/20	Her JXBF	6-3⅜x4¼	263	6.1	200	82-3000	7-2½x10	Y	WG T9	4	Tim 54411H	SF	H	5.83-6.80	Tim 31102H	L4IHV	330	578	a	TX	60	8x2¾x¼	
3	(6)....(c.o.e.) 85	1565	104	215	20000	5360	7.50/20D	9.75/20	Her JXCF	6-3⅜x4¼	282	6.1	216	86-3000	7-2½x10	Y	Cla 185F	5	Tim 55411H	SF	H	5.71-7.40	Tim 32515H	L4IHV	374	654	a	TX	60	8x2¾x¼	
4	(6)....(c.o.e.) 89	1945	104	215	20000	5840	8.25/20D	9.75/20	Her JXDF	6-4x4¼	320	5.9	244	95-2800	7-2½x10	Y	Cla 205V	5	Tim 56411H	SF	H	6.16-7.40	Tim 32515H	L4IHV	415	735	a	TX	60	8x2¾x¼	
5	(6-7)(c.o.e.) 89H	2175	104	215	22500	5840	8.25/20D	9.75/20	Her JXDF	6-4x4¼	320	5.9	244	95-2800	7-2½x10	Y	Cla 205V	5	Tim 58301H	SF	H	6.83-7.80	Tim 32515H	L4IHV	504	844	a	TX	60	8x2¾x¼	
6	Gramm.....11A	695	131	155	6500	2850	7.00/16S	7.50/16S	Her QXB3G	6-3¼x4½	205	5.8	144	66-3500	7-2½x10	N	WG T88	3	Spl 51-1	SF	H	**-5.10	Spl 50-1	L4IH	218	328	a	TX	60½	7x2¾x	TTTT
7	(9).....21A	745	131	155	10000	3000	6.00/20S	32x6-8p	Her QXB3G	6-3¼x4½	205	5.8	144	66-3500	7-2½x10	N	WG T9	4	Cla R650	SF	H	4.62-6.17	Cla F182	L4IH	212	352	a	TX	60½	7x2¾x	
8	(9).....31A	825	131	227	12000	3300	6.00/20S	32x6-8p	Her QXC3G	6-3⅜x4¼	221	5.9	154	67-3000	7-2½x10	N	WG T9	4	Cla R750	SF	H	5.10-6.83	Cla F266	L4IH	233	392	a	TX	60½	7½x2¾x¼	
9	(9).....41A	885	131	227	14000	3750	6.00/20S	8.25/20	Her QXC3G	6-3⅜x4¼	221	5.9	154	67-3000	7-2½x10	N	WG T9	4	Tim 53300	SF	H	4.57-6.20	Tim 30000H	L4IH	238	402	a	TX	60½	7½x2¾x¼	
10	(9).....46A	1095	131	227	14000	3900	6.00/20D	8.25/20	Her JXBG	6-3¼x4¼	263	6.1	187	82-3000	7-2½x10	N	WG T9A	4	Tim 53300	SF	H	4.57-6.20	Tim 30000H	L4IHV	238	578	a	TX	60½	10x2¾x	
11	(9).....56A	1295	131	227	15000	4700	6.50/20D	9.00/20	Her JXBG	6-3¼x4¼	263	6.1	187	82-3000	7-2½x10	N	WG T9A	4	Tim 53300	SF	H	4.12-6.80	Tim 31000H	L4IHV	338	578	a	TX	60½	10x2¾x	
12	(9).....71A	1595	131	227	17000	5200	7.00/20D	9.75/20	Her JXDG	6-4x4¼	320	5.9	244	95-2800	7-2½x10	Y	Cla 185F	5	Tim 53411	SF	H	5.71-7.40	Tim 31000H	L4IHV	338	578	a	TX	60½	10x2¾x	
13	(9).....76A	1895	131	227	21500	5700	7.50/20D	10.50/20	Her JXDG	6-4x4¼	320	5.9	244	95-2800	7-3x10	Y	Cla 205V	5	Tim 55411	SF	H	5.71-7.40	Tim 32500H	L4IHV	374	654	a	TX	60½	10x2¾x	
14	(9).....86A	2195	131	227	14000	4100	6.00/20S	8.25/20	Her JXDB	6-3½x4½	260	14.	178	77-2600	7-3x10	Y	Cla 185F	4	Tim 53300	SF	H	4.12-6.80	Tim 31000H	L4IHV	334	578	a	TX	60½	10x2¾x	
15	(D) (9)....D46A	2420	131	227	15000	4900	6.50/20D	8.25/20	Her DJXB	6-3½x4½	260	14.	178	77-2600	7-3x10	Y	Cla 200V	5	Tim 53411	SF	H	5.72-6.29	Tim 31000H	L4IHV	334	578	a	TX	60½	10x2¾x	
16	(D) (9)....D56A	2620	131	227	17000	5400	7.00/20D	9.00/20	Her DJXC	6-3½x4½	298	14.	194	84-2600	7-3x10	Y	Cla 200V	5	Tim 55411	SF	H	4.44-7.40	Tim 32500H	L4IHV	380	660	a	TX	60½	12x2¾x	
17	(D) (9)....D71A	2875	131	227	19000	5700	7.00/20D	9.75/20	Bud 6DT-31	6-3⅜x5½	317	14.	224	90-2300	7-3x9½	Y	Cla 270V	5	Tim 58300	SF	H	5.25-6.83	Tim 33000H	L4IHV	474	768	a	TX	60½	12x2¾x	
18	(D) (9)....D76A	3245	131	227	21500	6000	7.50/20D	10.50/20	Bud 6DT-38	6-3⅞x5½	389	14.	284	96-2100	7-3x12½	Y	Cla 270V	5	Wis 1337H	2F	H	5.63-8.59	Tim 35000H	L4IHV	474	768	a	TD	67	12x2¾x¼	TP
19	(D) (9)....D86A	4230	131	227	28000	8000	9.00/20D	10.50/20	Her WXLC3	6-4¼x4¾	404	5.9	284	96-2100	7-3x12½	Y	Cla 270V	5	Wis 1337H	2F	H	5.63-8.59	Tim 35000H	L4IHV	474	768	a				
20	(9).....96A	3395	131	227	28000	8100	9.00/20D	10.50/20	Bud 6DT-38	6-3⅞x5½	389	14.	284	143-1600	7-3½x17	N	BL 744	4	Wis 1337H	2F	H	4.29*7.2	Tim 33000								
21	(D) (9)....D96A	5075	131	227	28000	9050	9.75/20D	10.50/20	Her HXC	6-5¼x6	779	4.5	505																	
22	.....GF	5500	150	225	24000																										
23	Hug.....15W	1875	133	163	14000	4400	6.50/20D	8.25/20	Wau 6BM	6-3⅝x4¼	263	5.0	175	74-2500	7-2⅝x10¼	Y	Cla 185F	4	Cla 950	SF	H	**-6.83	Cla F308	L4IHV	306	510	a	T	62	8x3x¼	TTTT

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Line Number	MAKE AND MODEL	Chassis List Price	WHEEL-BASE Minimum Standard	WHEEL-BASE Maximum Standard	Gross Vehicle Weight for Normal Service	Chassis Weight (See definition)	TIRE SIZES D-dual rear S-single rear: Standard Front and Rear	TIRE SIZES: Maximum Authorized Tire Size	ENGINE DETAILS: Make and Model	No. of Cylinders, Bore and Stroke	Displacement	Comp. Ratio	Torque lb. ft.	Max. Brake H.P. at R.P.M. Given	Main Bearings: Number, Diameter and Length	Governor Standard	TRANSMISSION: Make and Model	Forward Spd's	REAR AXLE: Make and Model	Gear and Type	Drive & Torque	Gear Ratio Range in High	FRONT AXLE: Make and Model	BRAKES SERVICE: Make Location Type Operat'n	Lining Area	Drum Area	Drum Material	Hand Location Type	C-A Dimensions (Min. Std. W. B.)	FRAME: Side Rail Dimensions	Type
1	Hug.....44-4	5425	150	160	24000	9600	10.50/20S	10.50/20	Wau 6SRL	6-4⅛x5½	462	4.6	327	112-2200	7-3x12¾	Y	Fu 5A620	5	Wis 72000	2F	H	5.00-7.27	Wis F213	L4IHV	536	864	a	TD	70¼	9⅛x3x⅛	TTT
2	.....D-44-4	6840	150	160	29000	11000	10.50/20S	10.50/20	Bud 6LD468	6-4¼x5½	468	12	345	114-2000	7-3x11½	Y	Fu 5A620	5	Wis 72000	2F	H	5.00-7.27	Wis F213	L4IHV	536	864	A	TD	70¾	9⅛x3x⅛	TTT
3	45-4	6125	150	160	29000	11000	10.50/20S	10.50/20	Wau 6SRK	6-4⅛x5½	517	4.5	365	125-2200	7-3x13⅜	Y	Fu 5A620	5	Wis 1337	2F	H	5.53-8.59	Wis F313	L4IHV	625	972	a	TD	70¼	9⅛x3x⅛	TTT
4	.....D-45-4	7500	150	160	29000	11000	10.50/20S	10.50/20	Bud 6LD468	6-4¼x5½	468	12	345	114-2000	7-3x11½	Y	Fu 5A620	5	Wis 1337	2F	H	5.53-8.59	Wis F313	L4IHV	625	972	A	TD	70¾	9⅛x3x⅛	TTT
5	46-4	8050	160	170	35000	11800	11.25/20S	11.25/20	Wau 6GAL	6-5x5½	648	4.6	468	132-1800	7-4x18⅜	Y	Spl 7351	5	Wis 1737	2F	H	5.75-9.16	Wis F417	W41A	654	972	a	TD	86½	10x3x⅜	T
6	.....D-46-4	9025	160	170	35000	11800	11.25/20D	11.25/20	Cum HB6	6-4⅞x6	672	17	500	150-1800	7-4½x16½	Y	Spl 7351	4	Wis 1337	2F	H	5.75-9.16	Wis F417	W41A	654	972	A	TD	86½	10x3x⅜	T
7	Kenworth.....539	6118	134	146	24000	19180	9.00/20D	9.75/24	Bud K428	6-4¾x4¾	428	5.3	302	108-2400	7-3x11½	Y	Fu 5A62	5	Wis 72300	2F	H	5.77-8.40	Wis F207	L4IHV	458	785	a	PD	72	7½x3¼x½	CCC
8	540	7251	134	146	27700	10310	9.75/20D	9.75/24	Bud K428	6-4⅜x4¾	428	5.3	302	108-2400	7-3x11½	Y	Fu 5A62	5	Wis 1337	2F	H	6.85-9.41	Wis F323	Ws4IA	648	975	a	PD	72	7½x3¾x½	CCC
9	541	7835	134	146	27700	10650	9.75/20D	9.75/24	Bud LO525	6-4½x5½	525	5.5	385	135-2200	7-3x11½	Y	Fu 5A62	5	Wis 1337	2F	H	6.85-9.41	Wis F323	Ws4IA	648	975	a	PD	72	7½x3¾x½	CCC
10	542	8412	134	146	35000	10935	10.50/20D	10.50/24	Bud LO525	6-4½x5½	525	5.5	385	135-2200	7-3x11½	Y	Fu 5A62	5	Wis 1757	2F	H	6.02-8.50	Wis F427	Ws4IA	648	975	a	PD	72	7½x3¾x½	C
11	Marmon-Herr.																														
12	....(*)(c) LD4-4	1557	113	113	4500	2695	7.50/15S	9.50/15S	Ford V8	8-3⅛x3¾	221	6.1	155	85-3800	3-2.5x5⅜	N	Ford	4	Ford	S¾	U	**-4.44	Own LD4	F4IH	162	264	ae	2I	38½	5½x2x.11	TDx
13	....(*)(c) OT3-4	1715	123	123	6800	3331	7.00/17S	9.75/18S	Ford V8	8-3⅛x3¾	221	6.1	155	85-3800	3-2.5x5⅜	N	Ford	4	Ford	SF	U	**-4.86	Own OT3	F4IH	201	308	ae	2I	48½	6x2¼x⅛	T
14	....(*)(c) H5-4	1602	134	134	13200	3959	6.00/20D	10.50/18	Ford V8	8-3⅛x3¾	221	6.1	150	85-3800	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-6.67	Own IX4-11	F4IH	303	506	ae	TX	60½	7x2½x½	TTT
15	....(*)(c) H6-4	1649	158	158	13220	4039	6.00/20D	10.50/18	Ford V8	8-3⅛x3¾	221	6.1	150	85-3800	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-6.67	Own IX4-11	F4IH	303	506	ae	TX	84½	7x2½x½	TTT
16	(*)(c)(c.o.e.) H5-4	1875	134	134	13200	3994	6.00/20D	8.25/18	Ford V8	8-3⅛x3¾	221	6.1	150	85-3800	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-6.67	Own IX4-12	F4IH	303	506	ae	TX	93	7x2½x½	TTT
17	(*)(c)(c.o.e.) H6-4	1910	158	158	13200	4074	6.00/20D	8.25/18	Ford V8	8-3⅛x3¾	221	6.1	150	85-3800	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-6.67	Own IX4-12	F4IH	303	506	ae	TX	117	7x2½x½	TTT
18	....(*)(c) HH5-4	1627	134	134	13200	3959	6.00/20D	10.50/18	Ford V8	8-3⅛x3¾	239	6.1	170	95-3600	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-6.67	Own IX4-11	F4IH	303	506	ae	TX	60½	7x2½x½	TTT
19	....(*)(c) HH6-4	1674	158	158	13200	4039	6.00/20D	10.50/18	Ford V8	8-3⅛x3¾	239	6.1	170	95-3600	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-6.67	Own IX4-11	F4IH	303	506	ae	TX	84½	7x2½x½	TTT
20	(*)(c)(c.o.e.)HH5-4	1900	134	134	13200	3994	6.00/20D	8.25/18	Ford V8	8-3⅛x3¾	239	6.1	170	95-3600	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-6.67	Own IX4-12	F4IH	303	506	ae	TX	93	7x2½x½	TTT
21	(*)(c)(c.o.e.)HH6-4	1935	158	158	13200	4074	6.00/20D	8.25/18	Ford V8	8-3⅛x3¾	239	6.1	170	95-3600	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-6.67	Own IX4-12	F4IH	303	506	ae	TX	117	7x2½x½	TTT
22	(*)(c) H5MB-4	2980	134	134	9600	4097	13.50/24S	13.50/24	Ford V8	8-3⅛x3¾	221	6.1	155	85-3800	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-6.67	Own IX4-10	F4IH	303	506	ae	TX	60½	7x2½x½	TTT
23	(*)(c) H5MBS-4	4555	134	134	9600	5313	13.50/29S	13.50/24	Ford V8	8-3⅛x3¾	239	6.1	170	95-3600	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-9.12	Own769H-X1	F4IH	303	506	ae	TX	60½	7x2½x½	TTT
24	(*)(c) HH5MB-4	3005	134	134	9600	4097	13.50/24S	13.50/24	Ford V8	8-3⅛x3¾	239	6.1	170	95-3600	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-6.67	Own IX4-10	F4IH	303	506	ae	TX	60½	7x2½x½	TTT
25	(*)(c)HH5MBS-4	4580	134	134	9600	5313	13.50/24S	13.50/24	Ford V8	8-3⅛x3¾	239	6.1	170	95-3600	3-2.5x5⅜	N	Ford	4	Ford	SF	H	**-9.12	Own769H-X1	F4IH	303	506	ae	TX	60½	7x2½x½	TTT
26	....(*) DSD100-4	3375	143	Op	13200	5070	6.50/20	7.50/20	Her JXB	6-3⅝x4¼	263	5.4	182	78-2800	7-2½x10⅛	N	WG T9WG	5	Tim MH1011	SF	H	**-6.6	TWH 101	L4IH	267	452	a	TX	60	7⅛x2½x½	CCCC
27	....(*) DSD200-4	3635	143	Op	13200	5305	7.00/20D	7.50/20	Her JXC	6-3¾x4¼	282	5.3	196	84-2800	7-2½x10⅛	N	Ful 5A33	5	Tim MH1011	SF	H	**-6.6	TWH 101	L4IH	267	452	a	TX	60	7⅛x2½x½	CCCC
28	....(*) DSD300-4	3980	143	Op	15900	5795	7.50/20D	8.25/20	Her JXD	6-4x4¼	320	5.3	224	95-2800	7-2½x10⅛	N	Ful 5A33	5	Tim MH1022	SF	H	**-6.8	TWH 102	L4IH	281	527	a	TX	72	7⅛x3x¼	CCCC
29	....(*) DSD400-4	5275	158	Op	19500	7812	8.25/20D	9.00/20	Her WXC3	6-4¼x4½	383	5.0	260	106-2800	7-2⅝x13¼	Y	Ful 5A430	5	Tim MH1033	SF	H	**-6.83	TWH-103	L4IH	342	578	a	PD	72	9⅛x3x¼	CCCC
30	....(*) DSD500-4	5860	158	Op	23400	8710	9.00/20D	9.75/20	Her WXLC3	6-4¼x4¾	404	5.0	293	118-2800	7-2⅝x13¼	Y	Ful 5A430	5	Tim MH1044	SF	H	**-7.8	TWH 104	L4IH	384	785	a	PD	72	9⅛x3x¼	CCCC
31	....(*) DSD550-4	6440	158	Op	23400	8970	9.00/20D	9.75/20	Her RXB	6-4½x5¼	501	5.4	330	121-2200	7-3x13¼	Y	Ful 5A620	5	Wis MH1066	2F	H	**-7.52	WH 106	L4IH	461	785	a	FD	72	9⅛x3x¼	CCCC
32	(*)DSD550DR-4	7350	158	Op	23400	9980	9.00/20D	9.75/20	Her RXB	6-4½x5¼	501	4.5	360	121-2200	7-3x13¼	Y	Ful 5A620	5	Wis MH1055	2F	H	**-7.21	WH 105	Ws4IA	738	975	a	FD	72	10⅛x3x⅛	CCCC
33	....(*) DSD600-4	7700	161	Op	23400	9730	9.00/20D	9.75/20	Her RXB	6-4½x5¼	501	4.5	360	121-2200	7-3x13¼	Y	Ful 5A620	5	Wis MH1077	2F	H	**-7.52	WH 107	Ws4IA	738	975	a	FD	72	10⅛x3x⅛	CCCP
34	....(*) DSD700-4	8895	161	Op	25200	10330	9.75/20D	9.75/22	Her RXB	6-4½x5¼	501	4.5	360	121-2200	7-3x13¼	Y	Ful 5A620	5	Wis MH1088	2F	H	**-8.23	WH 108	Ws4IA	738	975	a	FD	102	10⅛x3x⅜	CCCP
35	....(*) DSD800-4	9750	161	Op	30000	10880	10.50/20D	10.50/22	Her RXC	6-4⅝x5¼	529	4.9	390	131-2200	7-3x13¼	Y	Ful 5A620	5	Wis MH1088	2F	H	**-8.23	WH 108	Ws4IA	738	975	a	FD	102	10⅛x3x⅜	CCCP
36	....(*) DSD900-4	12785	198	Op	30000	13530	10.50/20D	10.50/22	Her HXD	6-5½x6	855	4.5	555	180-2200	7-3½x16⅝	Y	Ful 4A86	4	Wis MH1099	2F	H	**-8.88	WH 109	Ws4IA	738	975	a	FD	102	10⅛x3x⅜	CCCP
37	....(*) DSD1000-4	13850	198	Op	40000	15680	10.50/24D	10.50/24	Her HXE	6-5½x6	935	4.5	610	198-2200	7-3½x16⅝	Y	Ful 4A86	4	Wis MH1099	2F	H	**-8.88	WH 109	Ws4IA	738	975	a	FD	102	10⅛x3x⅜	CCCP
38	(D)(*) DDSD200-4	4920	143	Op	13200	5705	7.50/20D	7.50/20	Her DJXB	6-3½x4½	260	14.	178	79-2600	7-3x10⅛	N	Ful 5A33	5	Tim MH1011	SF	H	**-6.6	TWH 101	L4IH	267	452	a	TX	60	7⅛x2½x½	CCCC
39	(D)(*) DDSD300-4	5155	143	Op	15900	6185	7.50/20D	8.25/20	Her DJXC	6-3½x4¾	298	14.	208	83-2600	7-3x10⅛	N	Ful 5A33	5	Tim MH1011	SF	H	**-6.6	TWH 101	L4IH	267	452	a	TX	60	7⅛x2½x½	CCCC
40	D*DDSD550DR-4	9640	158	Op	23400	10590	9.00/20D	9.75/22	Her DRXB	6-4½x5¼	474	14.	350	124-2200	7-3x13¼	Y	Ful 5A620	5	Wis MH1066	2F	H	**-6.65	WH 106	Ws4IA	738	975	a	FD	72	10⅛x3x⅛	CCCC
41	(D)(*) DDSD700-4	11350	161	Op	25200	10940	9.75/20D	9.75/22	Her DRXB	6-4½x5¼	474	14.	350	124-2200	7-3x13¼	Y	Ful 5A620	5	Wis MH1077	2F	H	**-6.65	WH 107	Ws4IA	738	975	a	FD	72	10⅛x3x⅛	CCCP
42	(D)(*) DDSD800-4	12150	161	Op	30000	11465	10.50/20D	10.50/22	Her DRXB	6-4½x5¼	474	14.	350	124-2200	7-3x13¼	Y	Ful 5A620	5	Wis MH1088	2F	H	**-7.0	WH 108	Ws4IA	738	975	a	FD	102	10⅛x3x⅜	CCCP
43	(D)(*) DDSD900-4	15310	198	Op	30000	14230	10.50/20D	10.50/22	Her DHXB	6-5x6	707	14.	530	176-1800	7-3¾x17	Y	Ful 4A86	4	Wis MH1088	2F	H	**-7.22	WH 108	Ws4IA	738	975	a	FD	102	10⅛x3x⅜	CCCP
44	(D)(*) DDSD1000-4	16105	198	Op	40000	16405	10.50/24D	10.50/24	Her DHXB	6-5x6	707	14.	530	176-1800	7-3¾x17	Y	Ful 4A86	4	Wis MH1099	2F	H	**-7.95	WH 109	Ws4IA	738	975	a	FD	102	10⅛x3x⅜	CCCP
45	Oshkosh (*)...JCB	2885	153	200	14000	5900	7.00/20D	9.00/20	Her JXC	6-3⅜x4¼	282	5.3	197	85-3000	7-2½x10⅛	Y	Fu 5B33	5	Tim 54400	SF	H	4.4-5.2	Own JCB	L4IH	335	578	a	TX	71	6x3½x¼	P
46	(*).....JD	3490	153	200	15500	6050	7.50/20D	9.00/20	Her JXD	6-4x4¼	320	5.3	224	94-2800	7-2½x10⅛	Y	Fu 5A43	5	Tim 54400	SF	H	4.4-5.2	Own JD	L4IH	335	578	a	TX	71	6x3½x¼	P
47	(*).....B3S	5140	146	201	21500	8250	10.50/20S	10.50/20	Her WXC3	6-4¼x4½	383	4.7	265	106-2800	7-2⅝x13¾	Y	Fu 5A43	5	Own B3S	SF	H	4.8-7.8	Own B3S	L4IH	510	867	G	TX	78¾	7x3x½	TfL
48	(*).....B3D	5590	146	201	23000	8250	10.50/20S	10.50/20	Her WXC3	6-4¼x4½	383	4.7	265	106-2800	7-2⅝x13¾	Y	Fu 5A43	5	Own B3D	2F	H	5.0-8.4	Own B3D	L4IH	518	867	G	TX	82	7x3x½	TfL
49	(*).....C3S	5635	146	201	23800	8700	9.75/20D	11.25/20	Her YXC2	6-4¼x4¾	453	4.4	300	100-2400	7-3x14	Y	Fu 5A620	5	Own C3S	SF	H	6.0-7.8	Own C3S	L4IH	630	975	G	TX	82	7x3x½	TfL
50	(*).....C3D	6185	146	201	24000	9575	9.75/20D	11.25/20	Her YXC2	6-4¼x4¾	453	4.4	300	100-2400	7-3x14	Y	Fu 5A620	5	Own C3D	2F	H	5.6-8.4	Own C3D	L4IH	630	975	G	TX	82	8¼x3x⅜	Tf
51	(*).....W-500	6165	150	204	25000	10600	10.50/20S	11.25/20	Her RXB	6-4½x5¼	500	5.4	330	110-2200	7-3x12¾	Y	Fu 5A620	5	Own 500	2F	H	7.27-8.6	Own 500	L4IH	630	975	G	TX	82	8¼x3x⅜	Tf
52	(*).....W-600	6750	150	204	26000	11100	10.50/20D	11.25/20	Her RXBO	6-4½x5¼	500	5.4	360	121-2200	7-3x12¾	Y	Fu 5A620	10	Own 600	2F	H	7.27-8.6	Own 600	L4IH	630	975	G	TX	82	10⅛x3x⅜	Tf
53	(*).....W-700	6900	150	204	29000	11500	10.50/20D	11.25/20	Her RXCO	6-4¾x5¼	529	5.4	380	128-2200	7-3x12¾	Y	Fu 5A620	10	Own 700	2F	H	7.27-8.6	Own 700	L4IH	630	975	G	TX	82	10⅛x3x⅜	Tf
54	(*).....W-800	7975	150	204	31500	12300	10.50/20D	12.00/20	Her RXLD	6-4¾x5¼	558	5.4	405	141-2200	7-3½x16⅝	Y	Spl 7341	4	Own BG	2F	H	4.7-6.8	Own BG3	B41M	666	975	G	TX	85	10x3¼x⅜	L
55	(*).....BG3	9200	168	190	38000	14200	13.50/20S	12.75/20	Her HXB	6-5x6	707	4.5	455	148-2000	7-3½x16⅝	Y	Spl 7341	4	Own GD	2F	H	5.3-7.4	Own GD	B4IM	666	975	G	FI	84	7x2¾x¼	T
56	(*).....GD	10400	168	190	40000	14500	13.50/20S	12.75/20	Her HXE	6-5¾x6	935	4.5	610	199-2000	7-3½x16⅝	Y	Own FNB	6	Own FNB	2D	H	6.0-8.0	Own FM	O4IA	450	670	G	FI	84	12x3½x½	TB
57	(*)Walter...FND	4900	126	150	20000	7500	9.75/20S	9.00/20	Wau WMK	6-4⅛x4¾	381	5.0	270	90-2200	7-2⅝x10¼	Y	Own FJD	6	Own FMB	2D	H	6.0-8.0	Own FM	O4IA	450	670	G	FI	84	12x3½x½	TB
58	(*).....FMD	6200	126	150	24000	8500	9.00/20D	9.75/20	Wau WSRL	6-4⅜x5½	462	5.0	325	110-2200	7-3x13¾	Y	Own FJD	6	Own FJB	2D	H	6.0-8.0	Own FJ	O4IA	450	670	G	FI	84	13x3½x½	TB
59	(*).....FKMD	7000	126	150	28000	9000	9.75/20D	10 50/20	Wau SRKR	6-4⅝x5½	517	5.5	369	125-2200	7-3x13¾	Y	Own FC	6	Own FCC	2D	H	7.5-9.0	Own FC	O4IA	560	670	D	FI	96	14x3¾x½	TB
60	(*).....FCKD	8400	126	138	30000	10500	9.75/24D	10.50/24	Wau SRKR	6-4⅝x5½	517	5.5	369	125-2200	7-3x13¾	Y	Own FC	6	Own FCC	2D	H	7.5-9.0	Own FC	O4IA	560	890	D	FI	96	14x3¾x½	TB
61	(*).....FCS	8600	138	162	30000	11000	9.75/24D	10.50/24	Wau SRKR	6-4⅝x5½	517	5.5	369	125-2200	7-3x13¾	Y	Own FA	6	Own FCC	2D	H	7.5-9.0	Own FC	O4IA	560	890	D	FI	96	14x3¾x½	TB
62	(*).....FBS	9900	138	162	31000	12000	10.50/24D	10.50/24	Wau RBR	6-5x5¾	677	5.3	485	150-2100	4-3½x11⅝	Y	Own FA	6	Own FCR	2D	H	7.5-9.0	Own FCR	O4IA	560	890	D	FI	108	14x3¾x½	TB
63	(*).....FBRS	10500	138	162	46000	13000	11.25/24D	12.00/24	Wau WRB	6-5x5¾	677	5.5	465	150-2200	4-3½x11⅝	Y	Own FA	6	Own FCC	2D	H	7.5 -9.1	Own FC	O4IA	560	890	D	FI	96	14x3¾x½	TB
64	(*).....FXBS	10700	138	162	31000	12000	10.50/24D	10.50/24	Her HXE	6-5¾x6	935	5.3	610	200-2000	7-3½x16⅝	Y	Own FA	6	Own FCC	2D	H	7.5 -9.1	Own FC	O4IA	560	890	D	FI	108	14x3¾x½	TB
65	(*)...(D) ADKD	10000	126	138	29000	12000	9.75/24D	10.50/24	Her DRXB	6-4⅜x5½	474	14.	350	125-2000	7-3x13¼	Y	Own FA	6	Own FCC	2D	H	7.5 -9.1	Own FC	O4IA	560	890	D	FI	108	14x3¾x½	TB
66	(*)...(D) ADBS	11000	138	162	32000	13000	10.50/24D	10.50/24	Cum HB6	6-4⅞x6	672	17.	500	150-1800	7-4½x16	Y	Own FA	6	Own AV	2D	H	** 10.5	Own AV	O4IA	620	1020	D	FI	96	16x4x⅜	
67	(*)...(D) ADVD	12500	126	162	65000	17000	13.50/24D	13.50/24	Cum HB6	6-4⅞x6	672	17.	500	150-1800	7-4½x16	Y	Own FA	6													

Six-Wheelers

Wheels Driven

68	(2) Autocar (1) ▼																														
69	.....C-4062	2F	3150	164	182	32000	9165	8.25/20D	9.00/20	Own 358	6-4x4¾	358	5.5	250	89-2400	7-3x12⅝	Y	Own RL5	5	Own DB	2F	H	6.49-7.89	Tim 35000	LO4IDV	466	694	c	FD	84	9x3x¼	Tf
70	.....C-7062	2F	4550	164	182	36000	11600	9.00/20D	9.75/20	Own 408	6-4⅛x5¼	408	5.5	295	110-2400	7-3½x13.76	Y	Own DF5	5	Own C	2F	H	7.20-8.57	Tim 35100	LO4IDV	580	930	c	FD	84	9x3x¼	TfL
71	.....C-8062	2F	5300	164	200	40000	12040	9.75/20D	10.50/20	Own 447	6-4¼x5¼	447	5.5	333	116-2400	7-3½x13.76	Y	Own TF5	5	Own TF5	2F	H	7.20-8.57	Tim 26452	LO4IDV	580	930	c	FD	102	10½x3x⅛	TfL
72	.....C-9062	2F	6050	182	222	45000	13040	10.50/20D	11.25/20	Own 501	6-4½x5¼	501	5.5	375	127-2300	7-3½x13.76	Y	Own CG	5	Own CG	2F	H	7.69-8.52	Tim 27452	TO4IA	631	930	c	D	125¾	9x3x¼	TfL
73	(D) DC-10062	2F	8000	216	216	68000	15870	9.75/20D	.....	Cum HB6	6-4⅞x6	672	17.	500	150-1800	7-4½x16½	Y	Own GD	5	Own GD	2F	H	4.4 -6.97	Tim 27452	TO4IA	631	930	a	FD	84	9x3x¼	Tf
74	c.o.e. U-4062	2F	3350	106	124	32000	9135	8.25/20D	9.00/20	Own 358	6-4x4¾	358	5.5	250	89-2400	7-3x12⅝	Y	Own URL5	5	Own DB	2F	H	6.49-7.89	Tim 35000	LO4IDV	466	694	c	FD	84	9x3x¼	Tf
75	e.u.s. U-7062	2F	5200	128	145	36000	11580	9.00/20D	9.75/20	Own 408	6-4⅛x5¼	408	5.5	295	110-2400	7-3½x13.76	Y	Own UDF5	5	Own C	2F	H	7.20-8.57	Tim 26452	LO4IDV	580	930	c	FD	103¼	9x3x¼	Tf
76	e.u.s. U-8062	2F	5500	128	145	40000	12760	9.75/20D	10.50/20	Own 447	6-4¼x5¼	447	5.5	333	116-2400	7-3½x13.76	Y	Own UTF5	5	Own CG	2F	H	7.69-8.52	Tim 26452	TWs4IA	631	930	c	FD	59	9x3x¼	TfL
77	e.u.s. U-9062	2F	6100	128	145	45000	13600	9.75/20D	11.25/20	Own 501	6-4½x5¼	501	5.5	375	127-2300	7-3½x13.76	Y	Own RL5	5	T-W SD252H	2F	T	7.66-8.44	Tim 35100	T4IHV	667	1191	c	FD	62	9x3x¼	TfL
78	.....C-4064	4R	4500	139	139	32000	10480	9.00/20D	9.00/20	Own 358	6-4x4¾	358	5.5	250	89-2400	7-3x12⅝	Y	Own DF5	5	T-WSD252W	2F	T	7.66-8.44	Tim 35100	TWs4IA	798	1191	c				
79	.....C-7064	4R	6000	142	182	36000	11060	9.00/20D	9.75/20	Own 408	6-4⅛x5¼	408	5.5	295	110-2400	7-3½x13.76	Y	Own TF5	5	TWSDD353W	2F	T	8.15-9.11	Tim 26452	TWs41A	998	1519	c	FD	62	10¾x3x¼	TL
																			12	TWSDD454W	2F	T	8.15-9.11	Tim 26452	TWs4IA	998	1519	c	FD	62	10½x3x⅛	TL
																									TW61A	998	1519	a	D	71	10½x3x⅛	L
																									TW61A	998	1519	a	FD	84½	9x3x¼	TfL

(*) Price includes chassis and cab. (x) Delivered at Factory Price. Includes all Federal Taxes but does not include any state and/or local taxes. (*) Mack—List price of chassis, diesel engine is an extra charge.

¶—11.25/24 single front. † Rear 32 x 6. x Front 7.00/20. ●—10.50/24 single front.

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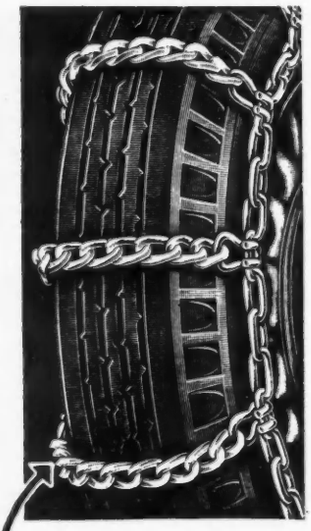
Line Number	MAKE AND MODEL		Chassis List Price	WHEELBASE Minimum Standard	WHEELBASE Maximum Standard	Gross Vehicle Weight for Normal Service	Chassis Weight (See definition)	TIRE SIZES Standard Front and Rear	TIRE SIZES D-dual rear S-single rear	TIRE SIZES Maximum Authorized Tire Size	ENGINE DETAILS Make and Model	ENGINE DETAILS No. of Cylinders, Bore and Stroke	ENGINE DETAILS Displacement	ENGINE DETAILS Comp. Ratio	ENGINE DETAILS Torque lb. ft.	ENGINE DETAILS Max. Brake H.P. at R.P.M. Given	ENGINE DETAILS Number, Diameter and Main Bearings Length	Governor Standard	TRANSMISSION Make and Model	TRANSMISSION Forward Spd's	REAR AXLE Make and Model	REAR AXLE Gear and Type	REAR AXLE Drive & Torque	REAR AXLE Gear Ratio Range in High	FRONT AXLE Make and Model	BRAKES Make Location Type Operat'n	BRAKES SERVICE Lining Area	BRAKES SERVICE Drum Area	BRAKES SERVICE Drum Material	BRAKES Hand Location Type	C-A Dimension (Min. Std. W. B.)	FRAME Side Rail Dimensions	FRAME Type
1	Sterling (16)HBT128	2C	4840	181	227	32000	10625	9.00/20D		9.75/20	Wau 6MZR	6-4¼x4¾	404	5.3	286	96–2400	7–2⅝x12½	Y	Fu 5A430	5	TimSBT252H	SF	L	5.57–7.80	Tim 35000N	L4rHV	504	968 a	TX	102	9x3½x¼	D
2	(15–16)HW8128	4R	5325	181	227	32000	10775	9.00/20D		9.75/20	Wau 6MZR	6-4¼x4¾	404	5.3	286	96–2400	7–2⅝x12½	Y	Fu 5A430	5	Tim SW451H	WF	L	6.20–10.40	Tim 35000N	L4rHV	504	968 a	TX	102	9x3½x¼	D
3	(15–16)JW8160	4R	8165	201	241	40000	12775	9.75/20D		10.50/20	WaudSRKR	6-4½x5⅛	517	5.4	308	125–2300	7–3x13¼	Y	Fu 5A62	5	Tim SW452W	WF	L	6.00–10.97	Tim 27452N	W84rHA	800	1316 a	TX	122	9¼x3⅝x¼	D
4	(15)HW8235S	4R	9090	201	241	50000	13575	10.50/20D		10.50/24	WaudSRKR	6-4½x5⅛	517	5.4	308	125–2300	7–3x13¼	Y	Fu 5A62	15	Own SR255W	CD	R	8.25–13.25	Tim 26452N	W84rHA	868	1368 a	JX	122	9¼x3⅝x¼	D
5	(15)HC8225	4R	9900	201	241	48000	14600	9.75/20D		10.50/24	WaudSRKR	6-4½x5⅛	517	5.4	308	149–2000	7–3½x14	Y	Fu 5A62	12	Own SR255W	CD	R	8.25–13.25	Tim 27452N	W84rHA	868	1368 a	JX	123	9¼x3⅝x⅜	D
6	(15)HC8255	4R	11410	211	251	60000	15800	10.50/20D		11.25/24	Wau 6EBR	6–5⅝x5¾	677	5.3	492	149–2000	4–9½x11	Y	Fu 4B86	12	Own SR255W	CD	R	8.25–13.25	Tim 27452N	W84rHA	868	1368 a	JX	123	9¼x3⅝x⅜	D
	Truckstell																																
7	(c)TRC-2X250	2F	1653	154	216	22000	5900	7.00/20xD		8.25/20	Chev	6–3½x3½	216	6.2	170	78–3200	4–2¼x5½	N	Chev	4	Eat 1325	SFd	U	5.83–8.57	Chev	C61HV	511	729 c	21	81	7½x3¾	C
8	(c)TRC-2X400	2F	1663	155	215	26000	6100	7.50/20xD		8.25/20	Chev	6–3½x3½	216	6.2	170	78–3200	4–2¼x5½	N	Chev	4	Eat 1465	SFd	U	5.5–9.02	Chev	B61HV	511	729 c	21	83	7½x3¾	C
9	(c)TRC-2X460	2F	1893	167	202	23000	6050	7.00/20xD		8.25/20	Chev	6–3½x3½	216	6.2	170	78–3200	4–2¼x5½	N	Chev	4	Eat 1325	SFd	U	5.83–8.57	Chev	C61HV	511	729 c	21	81	7½x3¾	C
10	(c)TRC-2X400	2F	2109	154	204	27000	6250	7.50/20xD		8.25/20	Chev	6–3½x3½	216	6.2	170	78–3200	4–2¼x5½	N	Chev	4	Eat 1465	SFd	U	5.5–9.02	Chev	B61HV	511	729 c	21	83	7½x3¾	C
11	(c)TRC-4XC26C	4R	2119	141	212	26000	6500	7.50/20xD		8.25/20	Chev	6–3½x3½	216	6.2	170	78–3200	4–2¼x5½	N	Chev-0	8	Chev	SFd	H	6.4	Chev	C61HV	511	729 c	21	66	7½x3¾	C
12	(c)TRC-4XC29E	4R	2481	141	212	29000	7100	7.50/20xD		8.25/20	Chev	6–3½x3½	216	6.2	170	78–3200	4–2¼x5½	N	Chev-0	8	Eat 1325	SFd	H	6.88–9.56	Chev	C61HV	511	729 c	21	66	7½x3¾	C
13	(c)TRC-4XC27C	4R	2338	116	186	27000	6690	7.50/20xD		8.25/20	Chev	6–3½x3½	216	6.2	170	78–3200	4–2¼x5½	N	Chev-0	8	Chev	SFd	H	6.4	Chev	C61HV	511	729 c	21	71	7½x3¾	C
14	(c)TRC-4XC30E	4R	2695	116	186	30000	7280	7.50/20xD		8.25/20	Chev	6–3½x3½	216	6.2	170	78–3200	4–2¼x5½	N	Chev-0	8	Eat 1325	SFd	H	6.88–9.56	Chev	C61HV	511	729 c	21	71	7½x3¾	C
15	(c)TRF-2X250	2F	1623	155	252	22000	5900	7.00/20xD		8.25/20	Ford	8–3½x3½	239	6.2	170	95–3600	3–2.554	7	Ford	4	Eat 1350	SFd	H	6.5–8.57	Ford	F61HV	501	836 a	TX	81½	7½x3¾	C
16	(c)TRF-2X400	2F	1880	156	253	26000	6000	7.50/20xD		8.25/20	Ford	8–3½x3½	239	6.2	170	95–3600	3–2.554	7	Ford	4	Eat 1450	SFd	H	6.5–9.02	Ford	F61HV	501	836 a	TX	83½	7½x3¾	C
17	(c)TRF-2X250	2F	1813	122	241	23000	5950	7.00/20xD		8.25/20	Ford	8–3½x3½	239	6.2	170	95–3600	3–2.554	7	Ford-0	8	Ford	SFd	H	6.5–8.57	Ford	F61HV	501	836 a	TX	83	7½x3¾	C
18	(c)TRF-2X400	2F	2079	123	242	27000	6050	7.50/20xD		8.25/20	Ford	8–3½x3½	239	6.2	170	95–3600	3–2.554	7	Ford-0	8	Ford	SFd	H	6.88–7.87	Ford	F61HV	501	836 a	TX	67½	7½x3¾	C
19	(c)TRF-4XF26F	4R	2130	143	210	26000	6600	7.50/20xD		8.25/20	Ford	8–3½x3½	239	6.2	170	95–3600	3–2.554	7	Ford-0	8	Eat 1350	SFd	H	6.88–9.56	Ford	F61HV	501	836 a	TX	67½	7½x3¾	C
20	(c)TRF-4XF29E	4R	2342	143	210	29000	7200	7.50/20xD		8.25/20	Ford	8–3½x3½	239	6.2	170	95–3600	3–2.554	7	Ford-0	8	Ford	SFd	H	6.88–7.87	Ford	F61HV	501	836 a	TX	77½	7½x3¾	C
21	(c)TRF-4XF27F	4R	2260	117	180	27000	6720	7.50/20xD		8.25/20	Ford	8–3½x3½	239	6.2	170	95–3600	3–2.554	7	Ford-0	8	Eat 1350	SFd	H	6.88–9.56	Ford	F61HV	501	836 a	TX	77½	7½x3¾	C
22	(c)TRF-4XF30E	4R	2383	117	180	30000	7380	7.50/20xD		8.25/20	Ford	8–3½x3½	239	6.2	170	95–3600	3–2.554	7	Ford-0	8	Eat 1350	SFd	H	6.88–9.56	Ford	F61HV	501	836 a	TX	77½	7½x3¾	C

* Front 7.00/20.

CLAW TRUCK CHAINS can take it!

20% more CLAW alloy steel biting at the point of traction GIVES LONGER, SAFER MILEAGE

Yes, CLAW chains can take the terrific punishment of truck transportation because they are *truck* chains right down to the alloy that goes into every last link.



No chain made can equal the holding power of the exclusive CLAW cross links—links with a protruding wedge of CLAW-alloy steel (toughest metal known to chaindom) that actually *CLAWS* into the roadway for a determined grip. (See diagram to the left.) This wedge, giving 20% more steel to each cross chain, is kept constantly sharp by the honing effect of the pavement.

CLAWS are quick on and sure on, thanks to the improved Blue Boy Fastener. Special Indented Rim Chains eliminate play and prevent excessive breakage between cross chains and rim chains.

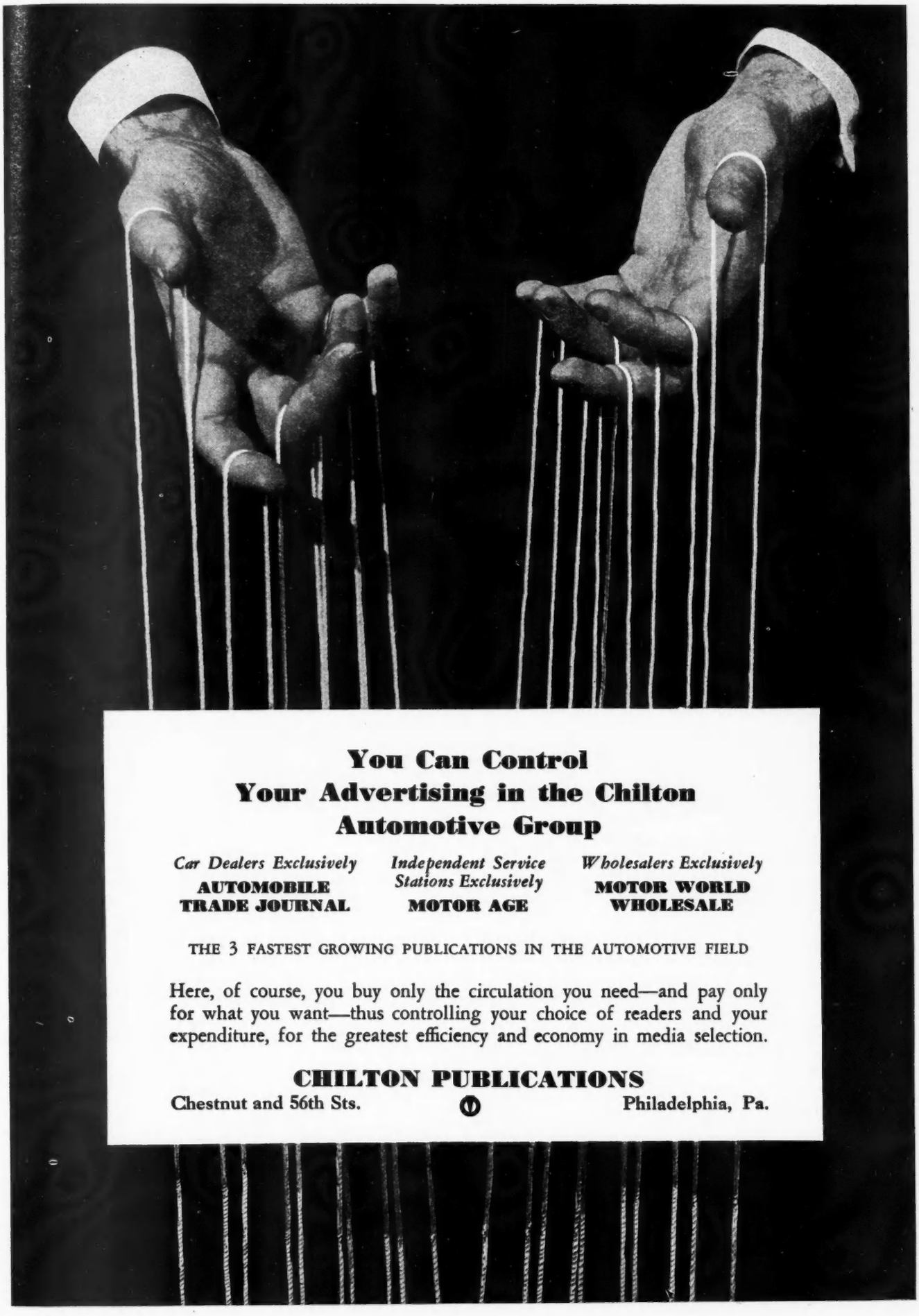
Keep your schedules on time in all kinds of weather and keep your chain costs down: Specify CLAWS all around.

COLUMBUS-McKINNON CHAIN CORP.

General Offices: TONAWANDA, N. Y.

Plants at St. Catharines, Ont. Can. *and* Vereeniging, So. Africa

CLAW★ TRUCK CHAINS



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THE 3 FASTEST GROWING PUBLICATIONS IN THE AUTOMOTIVE FIELD

Here, of course, you buy only the circulation you need—and pay only for what you want—thus controlling your choice of readers and your expenditure, for the greatest efficiency and economy in media selection.

CHILTON PUBLICATIONS

Chestnut and 56th Sts. **Philadelphia, Pa.**

When writing to advertisers please mention Commercial Car Journal

SHOW

(CONTINUED FROM PAGE 36)

army tanks, Diesel engines, gasoline motors, safety devices, tractors, trailers, oils, tools, shop equipment and about everything else. Trucks ranged all the way from the light delivery units with stake bodies through furniture vans to 50-ton coal trailers.

Nightly features of the show were ten-minute talks by outstanding and well known personalities in the trucking businesss. These were broadcast throughout the room through the amplifying system. Besides Mr. Winchester, these speakers included Walter F. Mullady, Chicago, who operates the Decatur Transfer Lines and is President of the Central Motor Freight Association; Prof. John S. Worley, of the University of Michigan, national authority on highway regulation; Governor Julius Heil, of Wisconsin president of The Heil Co., of Milwaukee; Ted V. Rodgers, president of the American Trucking Associations; J. H. Hayden, of the National Safety Council; and Taylor Super, executive sect'y, Illinois Road Builders Association.

At the banquet for the "Presidents" on Nov. 14 were more than 450 operators and fleet maintenance men. Principal speaker was Governor Heil. He talked on need for wider highways for greater road safety, pledging his efforts for this in Wisconsin. He also urged economy in government and lifting of taxes which are now being levied against American business.

Speaking on tax matters as they affect the motor truck industry, Ted V. Rodgers said that economy in state and federal government administration would permit removal of large numbers of levies, with resultant lowering of rates and costs to users of highway transportation.

Special guests at the banquet included:

Gordon Stoner (Midland Steel), L. C. Allman (Fruehauf), T. V. Rodgers, E. E. Norquist (Butler Tank), Paul Smith (Warner Brake), Clayton Farris (Trucktor), D. C. Fenner (Mack), L. G. Stelzle (Walter), Governor Julius P. Heil, Elbert E. Husted (Titeflex), Willard F. Rockwell (Timken Axle), Arthur W. Herrington (Marmon-Herrington), Charles Balough (Hercules), Joseph P. Heil (Heil), J. E. DeLong (Waukesha), A. F. Knoblock (Thornton Tandem), Donald P. Hess (American Bosch), Mason L. Thompson (Standard Steel), A. C. Hoof (Hoof), J. F. Winchester, C. J. Reese (Continental), Augustine Davis, Jr. (Davis Welding), Walter A. Olen (FWD), Harvey C. Fruehauf (Fruehauf), Leo Huff (Pure Oil), B. Lyle Brace (Brace Process).

Exhibitors at the show included: Aetna Parts Co., American Bosch Corp., American Safety Tank Co., Anderson Co., Arrow Safety Devices Co., Auto Truck Steel Body Co., Beattie Motor Co., Bendix Products Div., Bendix Westinghouse Auto Air Brake Co., O. F. Brooks, Buda Co., Butler Mfg. Co., Clean Oils Corp., Clear-Site Products, Continental Motors Corp., Fred E. Cooper Co., Couse Laboratories, Davis Welding & Mfg. Co. & Wm Powell Co., DeLuxe Products Co., Fleet Owner, Ford Motor Co., Four Wheel Drive Auto Co., Fruehauf Trailer Co., Gar Wood Industries, Inc., Globe Indemnity Co., Hegeman-MacCormack Co., Heil Co., Hemphill-Diesel Schools, Hercules Motors Corp., Highway Trailer Co., Hoof Products Co., Mack Trucks, Inc., Marmon-Herrington Co., Midland Steel Products Co., Motor State Products Co., Pierce Governor Co., Quaker City Iron Works, Standard Steel Works, Sterling Motors Corp., Thornton Tandem Co., Timken Detroit Axle Co., Titeflex Metal Hose Co., Transportation Engineering Co., Truckstell Corp., Trucktor Corp., Walter Motor Truck Co., Warner Electric Brake Mfg. Co., Waukesha Motor Co.

In commercial service, the type of vehicle is only part of the story, when it comes to selecting Edison Spark Plugs for added economy and long wear. The complete heat range coverage in the Edison line also permits a "custom fit" to suit all the varying conditions of road speed and load.

Edison *Heavy Duty* Plugs give you the Hi-Voltage Insulator, Leak-Proof Gasket; Condenser Action "Flat" Gap and Sealed-In Electrode Cap.

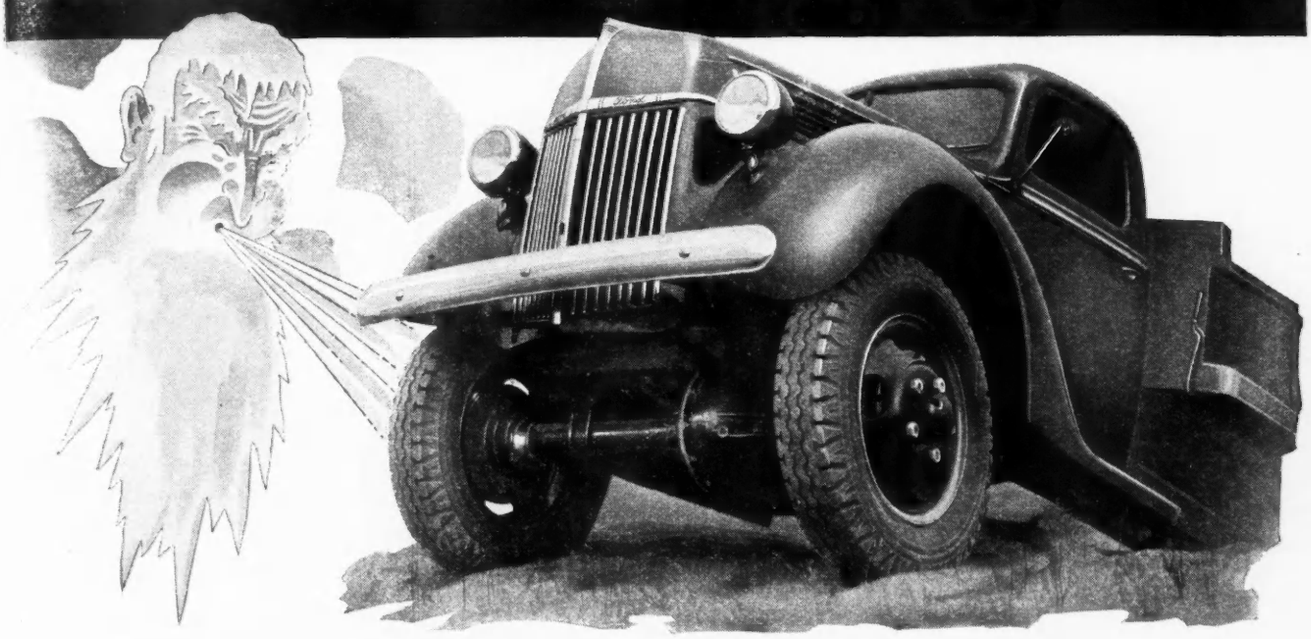
Edison *HC* Plugs stand up under the extreme heat of high speed and high compression that quickly burn up old-type plugs. They dissipate heat more rapidly, fire steadily at high speeds, reduce "ping" and increase gasoline mileage.

Let Edisons give you their *own* answer. Install a set. And watch them take it. They cost no more.

EDISON-SPLITDORF CORPORATION
WEST ORANGE, NEW JERSEY

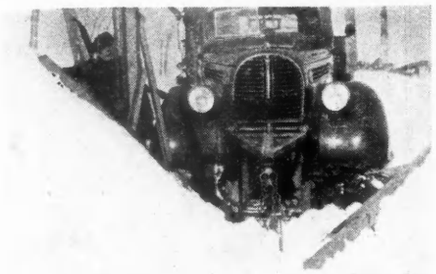
ONE OF THE Thomas A. Edison INDUSTRIES

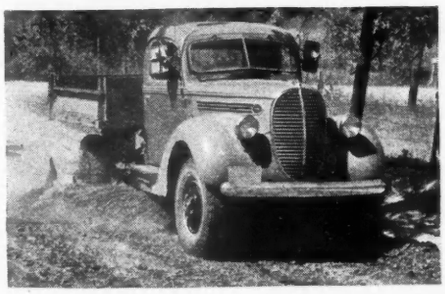
WHEN OLD MAN WINTER SAYS "No"...



MARMON-HERRINGTON

All-Wheel-Drives SAY "GO!"





Whether it's hot, whether it's cold, whether roads and fields, forests and hills are knee deep in mud or snow,—*there are always some jobs that must go on!*

Oil field equipment, supplies and men must be transported to and from drilling locations. Logging "shows" can't close down when blizzards howl, or when winter rains and thaws make quagmire of roads and forest trails. Ice and snow must be cleared from the nation's highways. Overland freight and passenger service must be maintained with safety on slippery curves and hills.

These are just a few of the many winter hauling jobs for which Marmon-Herrington *All-Wheel-Drives* are literally "made to order." Jobs that *only power and traction on all wheels can lick* with any degree of dependability and speed. Jobs that no other vehicles can handle with the same sureness, safety and economy.

For hauling tremendously heavy loads over the most difficult terrain there is a complete line of mammoth four- or six-wheel-drive trucks and truck-tractors with load capacities up to 25 tons for trucks, or 50 tons, or more for tractors. For lesser loads, but just as difficult "going," we convert all standard Ford trucks, commercial and passenger cars to *All-Wheel-Drive*. There is nothing like them in low price, economical operation and amazing ability to perform on steep hills, in deep mud, sand or snow. Catalogs describing 1940 models will be mailed promptly on request.

Cable address, MARTON, Indianapolis, Indiana, U.S.A.

MARMON-HERRINGTON COMPANY, Inc., Indianapolis, Indiana, U. S. A.

When writing to advertisers please mention Commercial Car Journal

TESTING

(CONTINUED FROM PAGE 21)

per cent increase in the number of trucks in service 1939 over 1938 which, of course, would result in an increase in the maintenance expense not quite in the same proportion but somewhat near it. However, there was only a 9 per cent increase shown in total maintenance expenses and in this expense, repairs to equipment increased only just over 11 per cent.

In making additions to the personnel in the garage, we have hired what might be termed "specialists" in the type of work which they perform. One man is assigned to a particular type of work such as carburetor adjustments, dynamometer adjustments, tire adjustments, engine rebuilding, brakes, etc. Naturally with specialists it is only reasonable to make certain deductions relative to the efficiency of the equipment as a result of the efficiency of the personnel.

While our mileage has increased 24 per cent, the actual tire cost has decreased nearly 8 per cent, a saving of over $10,000 in tires alone over an eight months' period. We also have a corresponding decrease in oil consumption which would figure in the neighborhood of $2,000.

These are some of the facts relating to savings based on identical mileage for 1938 and 1939, using 1939 mileage for a yardstick.

The question is now what has been the effect on the elimination of accidents and delays on the highway?

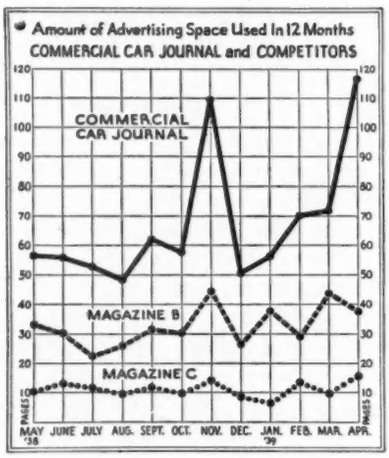
We are now getting into a subject that is somewhat obscure for the simple reason that it is not possible for us to show just what effects it has had on our operation. However, we do know that delays have been almost eliminated; that our accident ratio has gone down considerably during the period in which this machinery has been installed, with the exception of one month which was the month of September, 1939.

I might illustrate one thing which convinces me that this equipment is necessary. Sometime ago we had purchased a truck and in the first few months of operation it was involved in three accidents. All of these accidents pointed to defective brakes and while some consideration was taken of drivers' alibis, the fact could not be overlooked that three times straight reports of accidents pointed to the brakes. With the installation of our brake testing machines this inspection was made and it was found that the capacity of the brake drums on this particular type of truck was not sufficient for the loads which the truck was carrying and it was necessary to switch from a 2½-in. brake drum to a 3-in. brake drum. This was done and the accidents were eliminated. We all know the effect faulty brakes have on tires, and while the brake testing machine indicates the capacity of your brakes it also has an effect on tire mileage. The same is true in regard to all these testing machines, each one contributing in one way or the other to the elimination of accidents and delays.

A system of this kind or of any kind is inadequate unless there be developed along with it an analysis of each piece of equipment owned by the company giving the gasoline

(TURN TO PAGE 62, PLEASE)

COMMERCIAL CAR JOURNAL



Leads in Advertising Volume

The chart, of course, tells the story of COMMERCIAL CAR JOURNAL leadership. Any publication, head and shoulders above the others in its field, has the confidence of the manufacturers in its industry—and is getting results for them.

We started making these charts in 1935. They all look about alike — with COMMERCIAL CAR JOURNAL always out in front. It is the No. 1 Truck Fleet publication, with 30,000 circulation monthly.

COMMERCIAL CAR JOURNAL

A Chilton Publication

Chestnut & 56th Sts. Philadelphia, Pa.

Miles of Smiles

A restful, delightful railroad journey! What could be sweeter! Slip along mile after mile, hardly aware of the action of the train! That's the very high degree of operating comfort provided by Timken Roller Bearings. Timken Bearings make it possible for you to enjoy restful Miles of Smiles.

Most of the attractive, comfort-providing, thoroughly modern railroad trains are equipped with roller bearings—the majority of them with TIMKEN Roller Bearings. It is only a matter of time before *all* cars and locomotives (both passenger and freight) will be roller bearing equipped.

On your next trip, take a Timken Bearing Equipped train and discover a completely revolutionized standard of comfort! Here's Miles of Smiles for everyone!

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN
TAPERED ROLLER BEARINGS

NOTICE—Look for the trade-mark **TIMKEN** on every bearing, whether buying new equipment, or replacing a Timken Bearing in your automobile or truck, industrial or farm machinery. That trade-mark is your assurance of quality.

Copyright 1939 by The Timken Roller Bearing Company

This advertisement appears in the November 18 issue of The Saturday Evening Post

(CONTINUED FROM PAGE 60)

consumption, oil consumption, grease consumption, tire mileage, material and labor necessary for the maintenance of such equipment.

Such a cost analysis was maintained by us each month and we are able to determine the types of equipment which are giving us the greatest efficiency; which equipment needs adjustments; and which our drivers are operating most economically. (We have a system of assigning one driver to each particular truck which gives us, of course, the picture of the driver from the condition of the truck which he himself drives.)

A cost system can be simple or elaborate, but the simpler the system is the less expense it is to the management and the easier it is to check on equipment. Our system is not an elaborate system of cost accounting. It is a very simple system of requiring drivers to report defects on their defect cards, filing them with the garage. With these defect cards before them the mechanic and the foreman inspect the truck to see what can be done in regard to eliminating the defect. If it is necessary to use any new parts the card is immediately filed with the stock room clerk who issues the material necessary and indicates what material is used, on this particular card. After the job is completed the mechanics stamp on the card, by time clock, the number of hours consumed on that particular job. These cards are then filed with the statistical clerk who figures out the cost of the replacements and the proportion to be charged to labor, then enters it in the ledger opposite this particular piece of equipment. At the end of the month a statement is rendered to the management showing each piece of equipment separately with the gasoline consumption, oil consumption, tires, material and labor charge.

From the facts and figures given you I can only add: Take it or leave it; but leaving it you penalize only yourself.

Editor's note: The above article is based on a paper read by Mr. Willings at the Chicago convention of the American Trucking Associations, Inc.

GATKE
BRAKE BLOCKS
for
SAFETY
SERVICE
ECONOMY
BRAKE Gatke LINING
GENUINE
CUSTOM-BILT SET
If you will install GATKE Custom-Bilt BRAKE BLOCKS on 5 units and carefully check the results you will learn WHY GATKE BRAKE BLOCKS and LINERS are saving money for so many fleet operators.
Ask your GATKE Jobber or write us for complete information.
25th Gatke Anniversary 1914-1939
BRAKE LINERS AND BLOCKS
GATKE CORPORATION 228 N. La Salle St., CHICAGO, ILL.

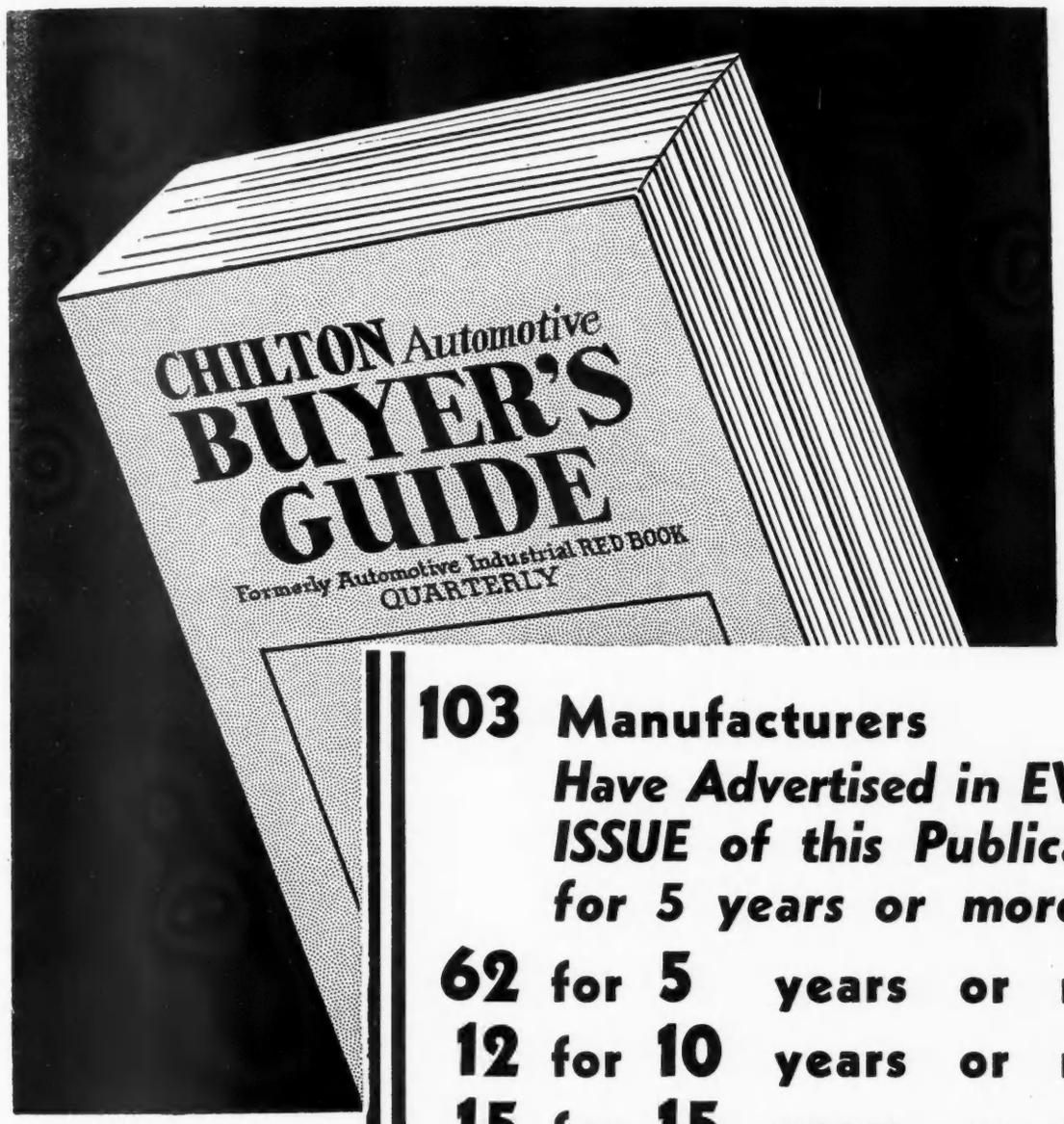
Freightways Becomes Biggest System

Several of the nation's largest trucking companies have formed a nationwide shipping service to be known as "Freightways." Included in the deal are Interstate Motor Lines, Salt Creek Transportation Co., Consolidated Freightways, Canadian Freightways, L. J. Russell Transportation Co. and Garrett Transfer & Storage Co. Each of the member companies will adopt the system name but will retain its separate identity. Elimination of transfer delays will be made through coordinated movements. Headquarters for the system will be in San Francisco with a main operating office in Salt Lake City.

QUIZ ANSWERS

(See Page 18)

1. Lockheed—others are makes of engines.
2. Glycerine—others are motor fuels.
3. Federal—others are trailer manufacturers.
4. King Pin—others are types of generators.
5. Force Feed—others are types of clutches.
6. Continental—others are axle manufacturers.
7. Full floating—others are types of springs.
8. Tillotson—others are makes of magnetos.
9. Carburetor—others are parts of electrical system.
10. Spur Gear—others are types of axle drives.



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Have Advertised in EVERY ISSUE of this Publication for 5 years or more •

62 for 5 years or more
12 for 10 years or more
15 for 15 years or more
4 for 20 years or more
4 for 25 years or more
6 for 30 years or more

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Circulation: 12,000 annually. Advertising Rates: as low as $12 per quarterly insertion. Ask for further details.

CHILTON
AUTOMOTIVE BUYER'S GUIDE
A Chilton Publication
Chestnut and 56th Streets ⓘ Philadelphia, Pa.

A. T. A.

(CONTINUED FROM PAGE 29)

our rightful place in the transportation sun or to achieve any undue competitive advantage over our industry."

The convention approved resolutions which favored the complete regulation of forwarding companies; opposed further statutory exemptions from the Motor Carrier Act of carriers who are engaged in interstate commerce but who operate solely in a single state; condemned the Association of American Railroads for opposing establishment of joint rates and through routes with the independent trucking industry; urged uniformity of state and Federal accounting rules and regulations; declared that in ICC discussions dealing with sizes and weights the ATA be against reducing in any state the limitations set by the laws of such state; asked that the ICC revise its $25 accident reporting rule because the extent of such property damage is not readily ascertainable, has no statistical value, and could be more properly and accurately given in an annual report.

Guest speakers who dealt with matters pertaining to the truck industry included U. S. Senator Harry S. Truman, of Missouri, Interstate Commerce Commissioner Clyde B. Aitchison and J. S. Arnold, of the banking firm of Kuhn, Loeb & Co.

Speaking of Senate bill S.2009 which he and Senator Wheeler sponsored, Senator Truman said that it represented a preliminary effort to create a national transportation policy.

"There is no way in the world," said Senator Truman, "to create traffic for the railroads or for ships or trucks by legislation. Many railroads are in bad condition financially, and that can only be remedied by an increased amount of tonnage. The whole legislative machinery of the United States cannot create traffic for anyone."

He pointed out that an examination of figures showed that all forms of transportation have received their share of subsidies. He said the railroads had received a subsidy of $4,000,000,000, including land grants, and that "everyone had better drop the subject of subsidy and unfair treatment by the government and get into the bandwagon of fair treatment for every form of transportation."

Commissioner Aitchison reviewed administration of the Motor Carrier Act and said that the "pioneering stage of administration is not over."

"There remain untouched many important problems peculiar to the motor transport industry," he said. "But from now on the normal tasks of carrier regulation will be an increasingly important part of the work. More and more stress is being laid on consistency and uniformity in regulatory policy in such matters as the establishment of reasonable rate standards, measures for enforcement of the law, control of capitalization and relations with other carriers, safety and service standards, and in correlation of the activities of competitors both within and without the industry."

Commissioner Aitchison acknowledged that many operators are violating the Motor Carrier Act. The Commission, he said, feels that resort should be had to penal remedies only when the lapses are due to a wrong intent on the part of the operator. But where lapses are made by innocent and well-meaning operators, the Commission "intends to pursue its process of field investigation and aid as long as need is reasonably apparent."

Mr. Arnold concerned himself with the future of railroads and trucks. He said:

"Like all seemingly irreconcilable antagonisms in our economy, the differences between the railroads and the trucking industry will eventually resolve themselves in some kind of compromise, leaving to the railroads the field where they are emphatically the more efficient and to the truckers the one in which they excel. Between the two there must of necessity remain a very wide middle ground in which the two forms of transportation will be in direct competition with one another.

"The development of the trucking industry to its full potentialities will undoubtedly kill off a lot of railroad mileage. The process will be something in the way of amputation of dead, unprofitable branch line mileage.

"The freight rate structure constitutes the most complicated element in commercial America and the solution of the question of competitive rates between trucks and railroads will become involved in the complete overhauling and revamping of the general rate structure. It seems inevitable, although staggering in its immensity."

Touching on public relations, Mr. Arnold said it would be "a wise move for the truckers to establish a more friendly feeling toward the public. You may feel that you have a perfect right to use the highways, but if you don't keep John Q. Public on your side you may find that right degenerating into a privilege that will be limited and circumscribed, and possibly even denied you."

Aside from the adoption of resolutions and election of officers, the annual meeting of the board of directors did not have much to occupy it. A move to enlarge the executive committee was defeated and a by-laws amendment to make the president's term one year only without salary was tabled. An amendment was passed increasing regional vice-presidents from 12 to 24. Irregular route common carriers were denied the right to organize a division within the ATA. A proposal that would have raised considerably the dues of some affiliated associations was referred to the executive committee.

The Common Carrier Division voted to establish a Washington office with Robert J. McBride, of Chicago, as general manager. Mr. McBride is a former chief examiner of the Illi-

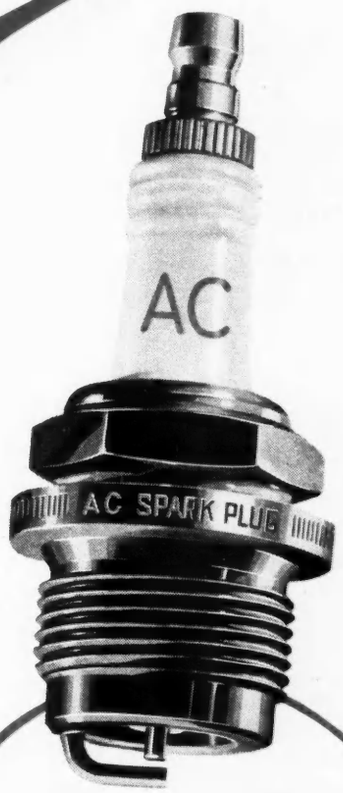
(TURN TO PAGE 66, PLEASE)

Mayor Stewart of Cincinnati congratulates J. W. Jacobson of F. J. Boutell Driveaway Co., Flint, Mich., for winning Trailmobile Award honorable mention. Winner on page 29

Harold Willings of Huber & Huber Motor Express, Louisville, also gets Mayor's congratulations for winning Trailmobile Award honorable mention. A third runner-up, not shown, was Hale Halsell Co., McAlester, Okla.

AC Stopped it!

RAPID Electrode WEAR



WHAT HAPPENED—

(a newspaper's experience). The spark plug problem was that of too rapid electrode wear, resulting in short plug life and unsatisfactory performance. Inspection showed that a cooler type of plug was needed. Tests were run with AC's of the correct heat range. The problem was solved.

WHY AC's SOLVED THE PROBLEM—

AC Spark Plugs, in all thread sizes, are made in a *complete* heat range. This range covers both the "hot" and the "cold" *extremes,* as well as all normal heat requirements. That's reason No. 1 why AC's met this operator's needs.

Equally important are the design and construction features of AC Spark Plugs. These add up to a quality and reliability unsurpassed in any spark plugs. Furthermore, AC design and construction are constantly being improved. Whenever new models of trucks and coaches produce new engine operating conditions, the AC plug to meet those conditions is ready to go to work.

That's why the AC "formula" is water-tight,—

1 Standardize on the right *make* of plug
2 Select the correct *Heat Range*
3 *Clean and regap* all plugs every 3,000 to 4,000 miles

That's why AC Spark Plugs—the AC Cleaning Machine—and the AC Gap Gauge assure fleet operators of *full* satisfaction.

AC SPARK PLUGS

-for Thirty Years

THE QUALITY SPARK PLUG

Chevrolet, Diamond-T, Federal, GMC, International and White Trucks; Buick, Cadillac, Chevrolet, La Salle, Nash, Oldsmobile, and Pontiac motor cars; Allis-Chalmers, Cletrac and International Harvester Tractors . . . these are some of the well-known trucks, cars, and tractors which use AC Quality Spark Plugs. Trust your spark plug requirements to the same brand of spark plugs which the leading, big-volume manufacturers select.

USE THESE FOR

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AC CLEANER—Cleans faster and better; cleans and dusts in one operation; available with or without stand.

AC GAP GAUGE—Four gap sizes; special round gauge stock,—accurately measures concave gaps.

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(CONTINUED FROM PAGE 64)

nois Commerce Commission. A motion to incorporate the division (as the Contract Carrier group is incorporated) was discussed at some length and tabled.

Officers elected were:

President, Ted V. Rodgers; 1st vice-president, H. D. Horton; 2nd vice-president, Oren H. Scott; 3rd vice-president, Henry E. English; 4th vice-president, C. J. Williams; secretary Chester G. Moore; treasurer, Lewis A. Raulerson.

VALVE

(CONTINUED FROM PAGE 23)

80,000 to 100,000 miles with the original valve springs, during which time repeated burnt or otherwise defective valves were replaced and, of course, only the broken springs replaced, where found. With the above information available, a campaign was initiated of replacing complete sets of springs in many of these units and a record kept of the results. The few illustrations given in Fig. 2 show the ultimate effect of this practice. The history of each of the three units from the time of purchase is given.

It is apparent that attention to the valve spring is desirable and that the average valve failure occurred approximately after 30,000 miles' operation since replacement of springs. This figure is considerably higher than the frequency of attention required up to the time that the springs were replaced.

The question next arises, what effect would be obtained by assuring a continuous spring pressure of 58 lb. or more for 40,000 miles operation? In this respect, consideration was given to spacers designed to increase the initial valve spring pressure 10 to 12 lb. so that even the poorest spring should be 58 lb. or more during the intended spring operating period. These spacers, approximately 1/8 in. thick, were placed above the spring and when the complete unit was compressed for installation in the valve chamber, the spacer was equivalent to starting with the spring compressed by the thickness of this spacer.

The results, using the spacer, appeared to have enough merit to warrant their general use, for example:

Truck No. 4—37,000 miles operation before a valve failure was encountered.

Truck No. 5—40,000 miles operation before a valve failure was encountered.

Truck No. 6—Valves untouched, still operating after 23,000 miles.

Truck No. 7—Valves untouched, still operating after 19,000 miles.

Truck No. 8—Valves untouched, still operating after 21,000 miles.

Truck No. 9—Valves untouched, still operating after 25,000 miles.

Thus the importance of valve spring tension on the satisfactory operation of valves can be seen, and furthermore, it is important that the tension of the spring be maintained above a certain fixed minimum. During the operation of the engine valves, there are two factors that must be taken care of to assure the proper spring pressure:

(1) Repeated refacing of the valve.

(2) Wear at the lower end of the valve key retainer.

The addition of these wear factors

(TURN TO PAGE 68, PLEASE)

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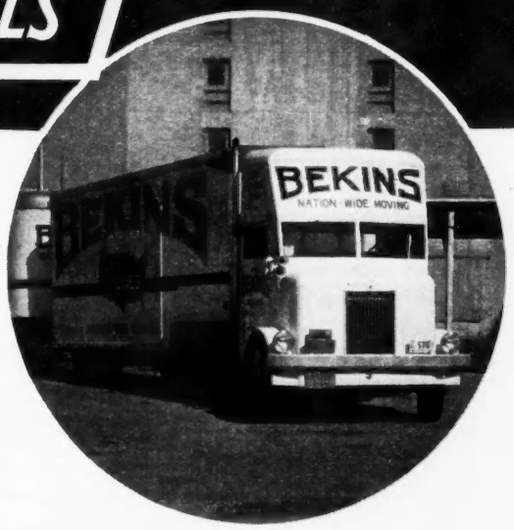

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(CONTINUED FROM PAGE 66)
can result in a drop in initial spring pressure of 10 lb. or more, since any increased length between valve face and retainer slot reduces the initial spring length compressed in place. In view of the valve wear encountered, the gage shown in Fig. 3 was designed, the purpose of this gage being to check the valve length before any work is done on the valve. This gage is marked for the particular type of valve, and has new valve length marking and also a limit mark. Valve lengths as measured, extending beyond the limit mark, are discarded as unfit for further service.

Before leaving the subject of valves, let us touch on material composition of valves, and its effect on valve-operating life. Most fleet operators have had some experience with Stellite-faced valves that have been introduced to the general truck industry. In some of our units operating under rather severe conditions, we have experienced 40,000 miles or more operation with this type valve in units that were previously encountering valve trouble from 5,000 to 20,000 miles operation. During the test work on Stellite-faced valves, it might be mentioned, that no other operating or maintenance condition was changed other than replacing the regular valve with the new type and continuing the truck in its regular service.

Summarizing the valve work on the particular trucks in question, spaces over the exhaust valve springs are specified and all valve springs replaced after 40,000 miles' operation. Stellite-faced valves have not been adopted for the average operating unit, since the regular valve has been found to meet this type of requirement. The Stellite-faced valves are specified only for certain units under severe operation.

The procedure outlined for our valve maintenance has been concerned chiefly with prolonging valve period maintenance and the results apparently are in the right direction. Experiments are now being conducted on the effect of much higher valve spring pressures on valve-operating life and wear. There is no doubt that this problem will continue being one of study, and as conclusive data are obtained they will naturally be incorporated in our regular maintenance program.

Crankshaft wear and the related bearing performance is another factor that should receive close attention in a maintenance schedule. In tracing through our experience with bearings and crankshaft wear for the last 5 or 6 years up to the newest model trucks, we have noticed considerable improvement made by the engine manufacturers in respect to design and materials.

For instance, crankshaft wear on a certain make truck purchased in 1933-34 necessitated a rigid control of scheduling and maintenance in order to keep the bearings in that engine. Fig. 4 shows data on crankshaft wear on the units in question and it is very apparent from this wear rate why close control was necessary. One very important point to be emphasized is the sudden increase in out-of-round measurements which occurred when the crankshaft wear reached about 0.005 in. Operating the engine with such bearing clearance, resulting from crankshaft wear, has a tendency to pound the journal, so that the vertical measurements of

(TURN TO PAGE 70, PLEASE)

NOW, it costs 25 to 50% LESS TO KEEP 'EM ROLLING!

Thanks to . . . HYPRESSURE JENNY

The Original Steam Vapor Spray Cleaner

One fleet maintenance superintendent reported that 50% of his mechanics' time was lost in fighting mud, grease, and dirt prior to inspection and repair of trucks. HYPRESSURE JENNY now saves $3400 yearly on that job; helps get trucks repaired and out on the road more quickly; and keeps 'em rolling on schedule. HYPRESSURE JENNY also quickly removes dirt that may add as much as 400 lbs. of dead weight to every load if allowed to accumulate. Strips oil base paint faster and better than any known method. Savings of 25 to 50% in time and labor costs are not unusual. You, too, can profit from the use of HYPRESSURE JENNY Steam Cleaning. Fill in and return the coupon below for a free survey of savings.

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FL-308

$21.75

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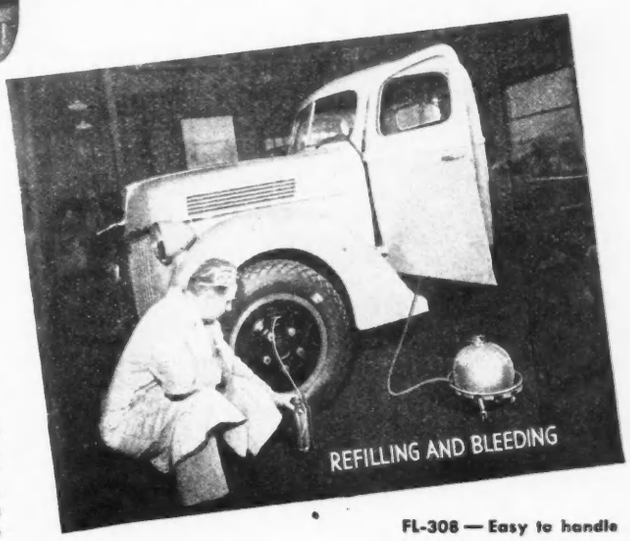
—makes an easy "one-man" job of bleeding and refilling the hydraulic brake system of any car or truck . . . . . .

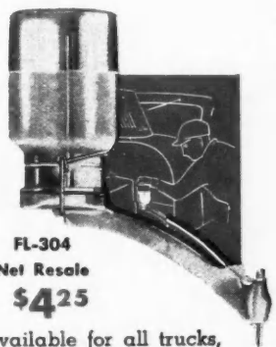


FL-308 — Easy to handle
Easy to use . . . . .

The Wagner FLUID-BAL is a portable pressure bleeder and refiller that has features not found in other bleeding and filling devices . . . Rigidly constructed, of rustless LYNITE aluminum alloy . . . Sturdy reinforced guard rail to protect the unit from damage . . . Guard rail also acts as a rack for the hose, keeping hose clean when not in use. . . . Large free-rolling casters permit easy moving . . . Hose can be used as a draw cord for moving the FLUID-BAL from job to job . . . Automatic shut-off valve prevents discharging air when fluid level is low . . . The filler cap is an integral unit consisting of a pressure gauge, relief valve and air inlet. It screws into a large opening for easy refilling. Fold-back type handle at top facilitates carrying when necessary . . . 3½ gallon capacity.

for adding small amounts of fluid to a master cylinder . . . . . .

Self-Leveling MASTER CYLINDER REFILLER (shown at left) saves time and saves fluid . . . Fully automatic—fills master cylinder to proper level—and no overflow is possible. Assures reliable job.



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$4.25

WAGNER LOCKHEED PARTS are available for all trucks, commercial cars and passenger cars having hydraulic brakes. These parts can be purchased individually, in kits and in assortments. Assortments are for a particular make of vehicle, and are also made up with contents to service many different makes of vehicles.

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(CONTINUED FROM PAGE 68)
the crank journal showed 0.002 to 0.003 in. more wear than the horizontal measurements. Therefore, in order to save the crankshaft, it is necessary to take up this wear periodically by means of bearing adjustment (removing adjustment shims) and keep the clearance well within the critical value given above.

In respect to the connecting rod bearings, the increased clearance resulting from journal wear, caused bearings to crack and break out. Our records showed that cracked bearings were encountered when the total bearing clearance (fit clearance plus wear) equaled about 0.005 in. We kept record of engines, noting conditions as found during maintenance work and it was evident that increased bearing clearance not only had an effect on the severity of the cracks in the bearings, but also, there was a decided tendency to encounter more cracked bearings per engine where the operating mileages extended beyond the critical point before a bearing inspection was made. See Fig. 5.

Introducing the subject of crankshaft wear and bearing clearance, mention was made of improvements in design and materials, and the effect on the maintenance of the units. In respect to the crankshaft, you have noticed the trend to harder type bearing journals. We have in the fleet, equipment with the conventional crankshaft averaging 300 Brinell hardness and also hardened shafts with a Brinell closer to 600. For comparative purpose, wear data has been accumulated on the same make truck, practically the same engine and operating under the same conditions, with both types of crankshafts. After 30,000 miles operation the following data was obtained:—

Average Maximum Crankpin Wear (Regular Shaft), 0.003 in.

Average Maximum Crankpin Wear (Hardened Shaft), None (X).

(X) Measurements taken were all within manufacturer tolerance covering new crankpin sizes.

Another group of trucks, but of a different make, employing the hardened shaft, were measured at periods from 30,000 to 70,000 miles and the maximum wear for any of the units, even after 70,000 miles operation, was only 0.001 in. This low wear rate of the hardened type shaft is comparable to the units mentioned above, and it is apparent that mechanical maintenance periods of this item can be extended materially, the only limiting operation mileage being, condition of the bearings themselves, or other mechanical maintenance such as rings, pistons, etc., which may necessitate dropping the crankcase.

We have, in many such units, been able to double the operating mileage period inspection of bearings where the hard crankshafts are used. Before this was established as a standard procedure, some routine inspections of a few representative units were made at 15,000 mile periods to be sure that we could safely operate to the extended periods.

Ramsey Accessories Mfg. Corp., has named Don Herr in charge of sales in Kentucky, Indiana, Illinois, Wisconsin, Minnesota, the Dakotas, Iowa and Missouri. Widely known in automotive circles, he was president of the International Garage & Maintenance Association.

Body designs copyright E. M. Westburg
Build Your Bodies
AROUND HANSEN HARDWARE
—as Modern as
the Most Modern Body
HANSEN HARDWARE has the unusual combination of modernness of design and built-in stamina to withstand the most severe commercial body service. Simple in design—easy to apply—dependable in operation—it is built for service and gives it!
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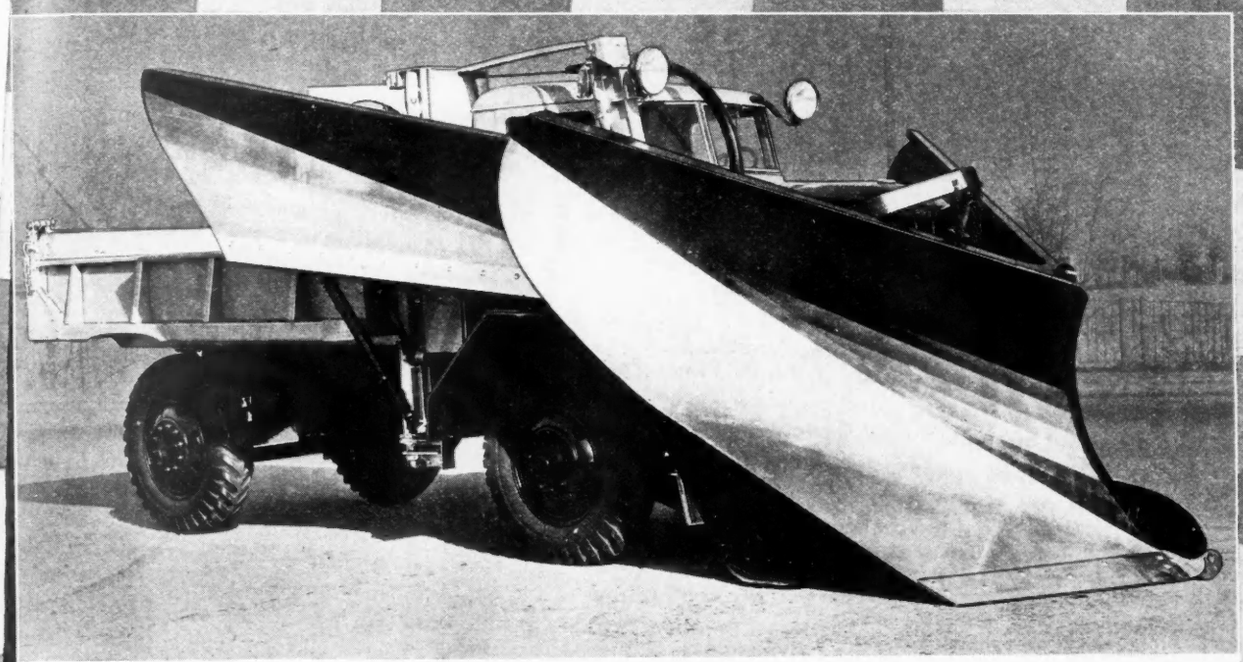
THE HARDWARE FOR HARD WEAR

MISTER, IT'S YOUR MOVE FOR OPEN ROADS THIS WINTER



Yes sir, it's your move if you want to be sure that the traffic will keep moving over your roads this winter, instead of being tied in a knot by snowdrifts.

WALTER SNOW FIGHTERS plow through the heaviest drifts with a driving, smashing force that is amazing to those who are familiar with rear-wheel and ordinary four-wheel drives only. Walter *Four-Point Positive Drive* provides such extraordinary traction and great available power as to have the complete confidence of road officials, bus companies and others in the "snow belt" where the problem of keeping roads cleared in mid-winter is a tremendously difficult one.

Ask us about Walter Automatic Lock Differentials . . . Suspended Double Reduction Drive . . . Ten-to-One Range Transmission . . . Exceptionally Powerful Heavy Duty Braking System, and other distinctive features that put Walter Snow Fighters in a class by themselves.

Mister, it's your move NOW.

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DESIGN vs MAINTENANCE

(CONTINUED FROM PAGE 27)

air brake lines, multiple control levers, and linkage on the new models, because the mechanic must grope for them in dark, out-of-the-way places.

The battery is inaccessible on some models, one in particular having it placed in such a position that it is necessary to remove the seat, all of the tools, and the floorboards in order to add distilled water. Such obstacles may lead the average service man to follow a course of least resistance, letting difficult operations go "until something happens."

Another complaint made by our maintenance men is the sensitivity of adjustment which is characteristic of the newer motors. Whereas the older models would operate efficiently with only approximately correct adjustments, absolute precision is almost essential in the care of current models. We find that we are now dealing with "Prima Donna" motors which require considerable outlay for special instruments and equipment with which to tune them up. The cost of the instruments themselves is nearly equalled by the cost of the additional time which is required in order to make the more delicate adjustments.

A third complaint from the maintenance department is the increase in the number of parts and inspection points which has come hand in hand with the latest mechanical improvements. The addition of each new inspection point naturally makes for an increase in inspection time, which involves added labor expense and a still greater outlay occasioned by the tying up of equipment which should be productively engaged.

We grant that the newer models are built to last longer and to deliver greater mileage before repairs and replacements are necessary, and we do not claim that this increased mileage has not offset the added cost of these operations. But we do feel that with a little thought and careful planning, we can eliminate much of the time which is now lost on individual operations as a result of awkward design.

To be more specific I have taken a recognized flat rate manual and studied a large number of maintenance operations on 1932 cars and corresponding operations on 1939 cars. From this voluminous study which shows a uniform increase in the time schedules for corresponding operations I have selected a few representative comparisons. These are given here. There are plenty more which would support any conclusion that might be drawn but space does not permit their use.

Fill Shock Absorbers

	1932	1939
Car A	¾	2½
Car C	½	1½
Car E	½	1½

Remove, Inspect and Replace Piston and Rod Assembly

Car A	4¼	5¾
Car B	4¼	6½
Car D	6¾	8½

Replace Front Fender

Car A	2¼	3
Car B	1¾	2¼
Car D	2	3½
Car E	1¾	2¼
Car F	1¾	2¾

Remove and Replace Timing Core Cover

Car A	3	3¾
Car B	2½	4½

(TURN TO PAGE 74, PLEASE)

YOU SEE IT WORK!

TO EXPOSE to plain sight the inner workings of an automotive Governor is exclusively a Handy idea. For Handy is the Governor able to stand up under such close scrutiny. In or out of sight, Handy Governor PERFORMS.

For all up to governed speeds, the Handy throttle stays wide open—no loss of power.

Then, as governed speed is reached, up comes the little cam and the Handy throttle closes, allowing no further acceleration.

In the Handy Visible Action Governor, YOU SEE all this take place. You can check the whole operation in a few seconds. That means virtually INSTANT INSPECTION—something no other governor provides.

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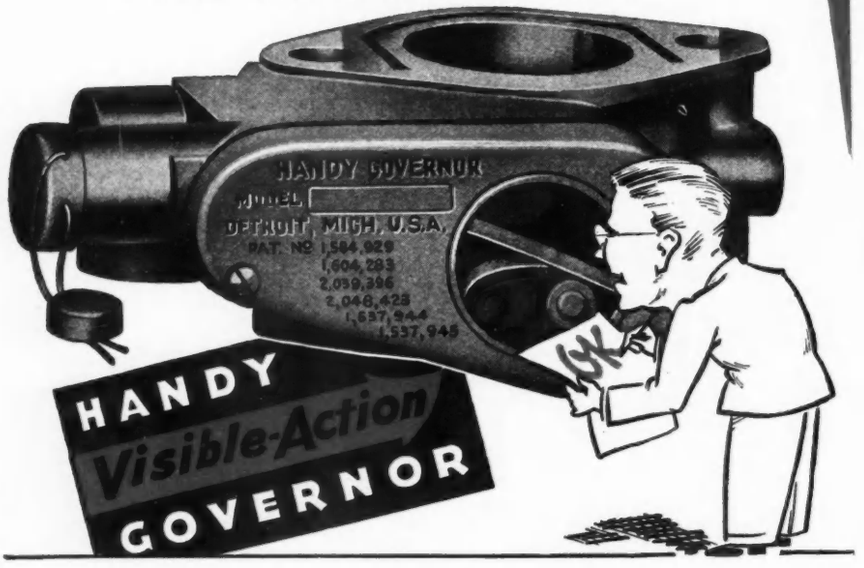
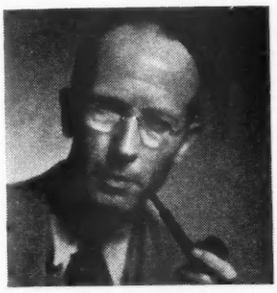


This sturdy ALL-STEEL body takes lots of punishment



Harvey B. Lindsay, President of Dry-Zero Corporation and inventor of the Lindsay Structure method which is revolutionizing steel body building.

It's a lightweight job, assembled to the exact size you need at no extra cost

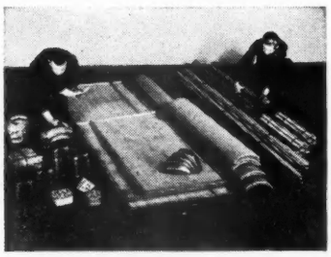
● Here is a practical solution to the question, What kind of body will give me the most for my money?

Already, 257 fleets have decided that Lindsay Structure ALL-STEEL *bodies are the answer!*

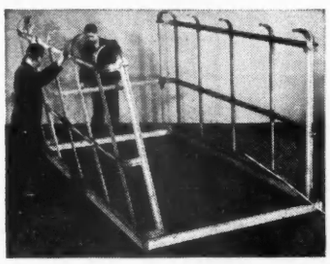
They are assembled to the exact size you need from Ls steel parts. Road tests show they stand up under the wracking strains of heavy loads, rough roads, and accidents. Yet they are remarkably light, due to the patented Lindsay Structure assembly methods. Repairs are made by substituting inexpensive standard parts.

Remember! There are no premium charges for this ALL-STEEL, lightweight body.

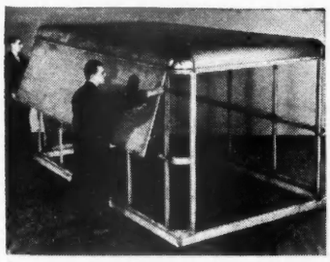
You should find out how well Lindsay Structure bodies fit your needs. Send the coupon for a free copy of the Lindsay Structure Bulletin. *Don't wait until you need a new body! Send the coupon now!*



1. Parts for Lindsay Structure bodies are die-formed by standard mass production methods in 4000 sizes, so that any size body can be built.



2. Side framing is assembled on the floor, then raised into place and bolted together. No cutting or fitting. No special tools are needed.



3. Panel sheets are set into flanged frames. They are "drawn" flat under even tension to take wracking stresses from the framing.

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(CONTINUED FROM PAGE 72)

Lubrication presents still another maintenance expense problem which has become greater with the advent of the newer models. Specialized, sensitive parts now require special lubricants which must be administered by means of special equipment, much of which costs more than the older, simpler lubricants and lubrication tools.

Using a recognized automotive lubrication manual as our base, we recently took averages of the number of lubrication points and number of lubricants required for all cars during the year 1933 as compared to the year 1939. We found that although the number of points requiring lubrication had decreased from 42.5 average in 1933 to 34.7 average in 1939, the number of lubricants required had gone up. 6.7 lubricants were required on the average for all cars in 1933, as compared to 7.5 on the 1939 models. The 1933 group included 53 cars, the 1939 group, 42.

It should be pointed out that many of the eliminated lubrication points have been replaced in the newer models by packings which require no further lubrication during the lifetime of the car. These parts, such as the clutch release bearings, rear wheel bearings, universal joints, and fan bearings, have been redesigned because in past years they were constantly neglected by service men. But the parts which remain to be lubricated, although smaller in number, are greater in complexity.

Let me emphasize the gratitude which all of us bear to those who have given our cars the modern mechanical improvements which make them the most beautiful, the most comfortable, and the most powerful in the world. We recognize the progress which has been made, and we are thrilled by it.

Yet let us not forget at the same time that certain of these improvements have resulted in definite increases in the cost of maintenance and repairs. Would it not be wise if we were to ease up for a year in an effort to consolidate our gains and to experiment with a simplification and rearrangement of the motors which we already have? This year let us consider the problems of the maintenance men and the mechanics. Let us first attempt to relieve them, and after we have done so, let us start forward again to new highs in the field of automotive engineering.

* * *

Here is the discussion that followed the presentation of the foregoing criticism at the S.A.E. National Transportation Meeting at St. Louis, as taken down by a member of the COMMERCIAL CAR JOURNAL staff:

Rising to the defense, F. K. Glynn, of American Telephone & Telegraph Co., declared "We can't have our cake and eat it, too. Mechanical costs have been coming down right along. We used to grind valves at 3000 miles. Now some are ground at 30,000 and some you can even forget. In the old days we used to make 150 radiator changes per 100 cars per year. Today changes are rare. Maybe it is the human machine that is at fault. The mechanics don't seem to turn out as much work as they used to."

(TURN TO PAGE 76, PLEASE)

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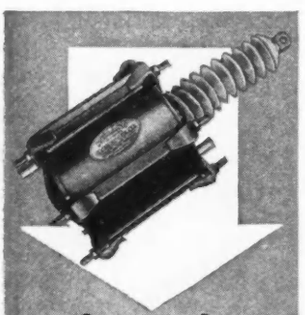

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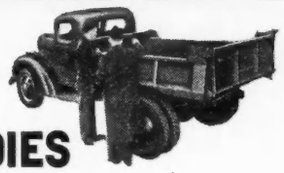

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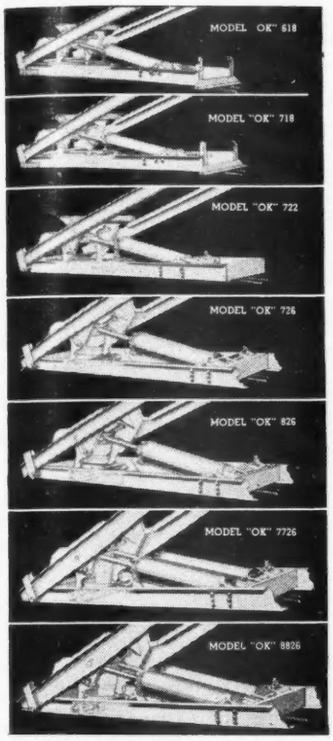

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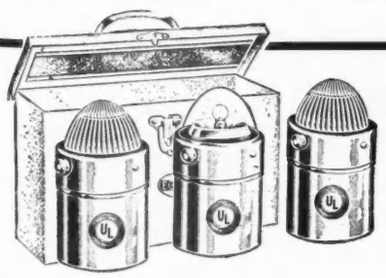

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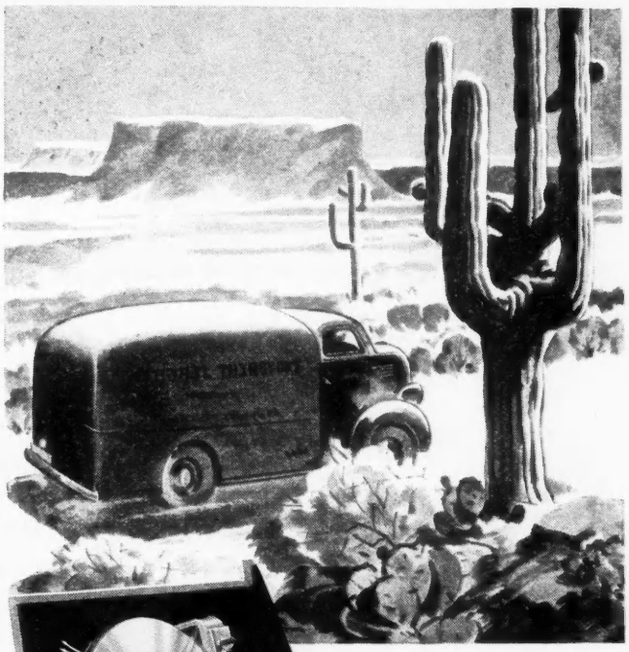

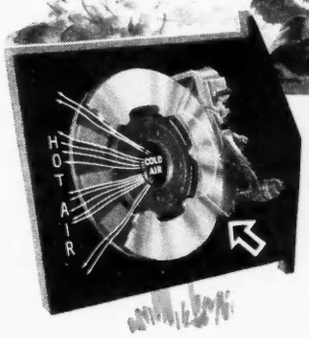

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(CONTINUED FROM PAGE 74)

Admitting that buses are hard to get at, Adam Ebinger, of the St. Louis Public Service Co., said that nevertheless his records showed there was 75 per cent less maintenance today than 8 years ago.

"Years ago," said Mr. Ebinger, "inspections were on a 500-mile basis. Today we have 4000-mile inspections. Clutches lasted 10,000 to 15,000 miles, whereas today they go 50,000 and 60,000 miles before requiring attention. It is true that the mechanic sometimes must be a contortionist but we must design trucks and buses so that they will make a good impression on the general public. It is also true that men do not produce as much work as they used to."

H. R. Grigsby, of the Oklahoma Gas & Electric Co., also arose to say that total operating costs were coming down even, as he put it, "though we operate in the oil fields of Oklahoma."

The sole break in the array of defense testimony came when W. J. Cumming, of the Surface Transportation Corp., New York City, got up to declare that "A lot of things that require contortionists could be done in a way to eliminate the contortions. More thought should be given to putting things on conveniently."

H. O. Mathews, of Public Utility Engineering & Service Corp., Chicago, considered Mr. Templin's facts interesting, but the question he wanted answered was: "How are new models affecting our preventive maintenance schedule?"

"Most of us," said Mr. Mathews, "have followed some sort of inspection program for a number of years. Have we changed the periods between inspections during the last five years? I think most of us have. For the same reason that the first engine, tires and other parts last longer today, it seems that the inspection intervals should be longer."

A prediction on the side of the defense was voiced by A. N. Snyder, of the Detroit Edison Co. "If we are patient," he said, "COE jobs will be cleaned up. COE jobs did increase our maintenance costs. They were about 9 per cent higher than in the case of conventional jobs. However, in checking with our delivery department we found that the increase was offset by a saving of 20 per cent in the cost per ton mile. Improvements are coming up in the next year or two that will eliminate most of the maintenance difficulties brought on by COE design."

Mr. Orr also conceded that "improvements in the quality of motor vehicles seem to offset to some extent the disadvantages of inaccessibility."

In his summing up, Mr. Templin bluntly stated, "We are not going to get anywhere whitewashing factory engineers. Maybe we have our inspection schedules too close together. Or perhaps we should find other means to determine when vehicles need attention. The question is still open. Maybe mechanics are turning out less work. But it's just simple logic that if you make it impossible for men to turn out the work, they just won't turn it out.

"My plea is that we of the Transportation & Maintenance Activity make known these defects to engineers and to enlist their help in correcting them."

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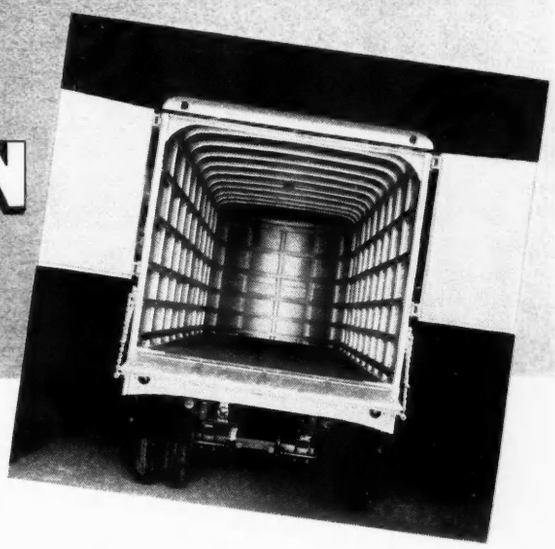

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S. A. E.

(CONTINUED FROM PAGE 31)

the original tread wore out was unusual. Today, due to new fabrics, new compounds and new methods of fabrication, the tire body has a considerable margin of safety in ordinary service. "It is this reserve strength or unused service of a tire that has laid the foundation for this new and important industry."

The authors gave the advantages and disadvantages of three types of tread renewal.

Full retread advantages cited were superior appearance and ability to retread a high quality sound casing even if there is some separation between tread and carcass at the shoulder. Disadvantages were: It is the most expensive in first cost; by wearing tires out there is a smaller percentage available for retreading; more possibility of road delays from flat tires in trying to get last mile from original tire; majority of tires will take only one full retread successfully.

Semi-retread or Full recap was given the sole advantage of having the appearance of the full retread. Disadvantages given were hidden potential trouble such as glass, stones, etc., that might be missed on inspection; ability to stand only one semi-retread; inability to give recap to a tire showing tread separation.

Recap, Tread-cap or Top-cap advantages were given as: Lowest in first cost; possibility of renewing tread more than once; no application of heat to sidewall of tire and higher percentage of tire life with non-skid tread. Disadvantages were: Tires showing tread separation cannot be recapped; tires in service must be removed at proper time.

A tip given by the authors was that "for the greatest economy in the long run, tires should be removed and recapped when there is from one-sixteenth to one-eighth inch of tread rubber remaining over the breaker. This means after the tire is worn approximately 75 per cent to 85 per cent of its normal life."

In the general discussion that followed presentation of the paper, Mr. MacCracken said that "it is becoming necessary for all tire companies to offer retreading service on a nation-wide basis."

C. R. Mason, of The B. F. Goodrich Co., amplified the formal paper by saying that the success of retreading depends upon the correctness of the original tire installation. The degree of success is affected by four factors: Whether the tire was the right one for the job, whether it was properly serviced, whether it was properly inflated, and whether duals were matched properly. He said retreading of tires that have undergone major sectional repairs should prove satisfactory if used in slow speed service with no overloads. If put in severe service they will fail before worn out. Mr. Mason gave retreads a higher mileage percentage than the original speakers. "Our experience," he said, "shows 75 to 100 per cent of new tire mileage on retreads and recaps."

D. A. Macdonald, of the United States Rubber Co., endorsed the paper and made these suggestions:

"Possibly the method most detrimental to the carcass is the full retread. This is brought about by the fact that all of the original undertread and shock plies are removed down to the carcass. In addition more of the tire area is confined in the mold which definitely applies more temperature to the carcass.

"The full recap confined practically the same tire area in the mold. The carcass, however, is protected by the original undertread.

"The top cap is the method that is least detrimental to the carcass in that heat is applied only to tread area.

"We have made very conclusive tests that prove definitely that the original undertread acts as an insulator to reduce the heat penetration of the carcass."

F. L. Faulkner, of Armour & Co., Chicago, declared that the statements in the paper paralleled his company's experience.

"We operate 65 million miles a year," he said. "In the main it is a slow-speed, delivery-type of service. All vehicles are governed, the governed speed averaging 35 m.p.h. We put tires through two, three and four recap operations. We pull a tire out of service when it still has adequate rubber, though smooth, for recapping. Only 25 per cent of the original tires become available for reworking, due to the great number of side bruises we experience. We are tightening up on our inspection standards and expect to make further gains in salvaging."

The question of tire age in relation to successful retreading was raised by Charles L. Mee, of Public Service Co. of Northern Illinois. "Say two tires are the same. Both have gone 36,000 miles. But one is one year old and the other is five years old. What consideration should be given to age?"

"Age must be considered on its own merits," Mr. MacCracken replied. "Old tires show check marks and the rubber is brittle. The chances are against retreads. I would say that five years is about the limit."

J. M. Orr, of Equitable Auto Co., Pittsburgh, Pa., brought up the matter of balancing of retreaded tires. "They should be balanced but not all shops are balancing them. In a test," he said, "we took seven recapped tires from our stock shelves. They were of seven different makes and they had been recapped by two independent recappers. We checked them and the out-of-balance ranged from 16 in.-oz. to 64 in.-oz."

Mr. Orr testified that "generally our experience with recaps has been good." He said 30 per cent of his tires can be recapped.

In their paper, Messrs. Fox and MacCracken gave the results of studies of thousands of tires on the effect of wheel position on tire mileage. The studies showed that trailer tires gave 33 per cent more mileage than driving tires, and front tires 57 per cent more mileage than driving tires.

L. W. Fischer, of Timken-Detroit Axle Co., asked "Why do trailer tires have 33 per cent greater life when checks have shown that they do 90 per cent of the braking in trailer operations?"

His question did not receive a satisfactory answer.

Another questioner asked, "Do differential wheels result in greater tire life?"

Mr. Fox volunteered the opinion that "basically they look alright, but we would like to have a little more experience with them before committing ourselves."

At the end of the session Mr. MacCracken gave figures which showed that, on the basis of retail list prices, recaps cost 38 per cent of the cost

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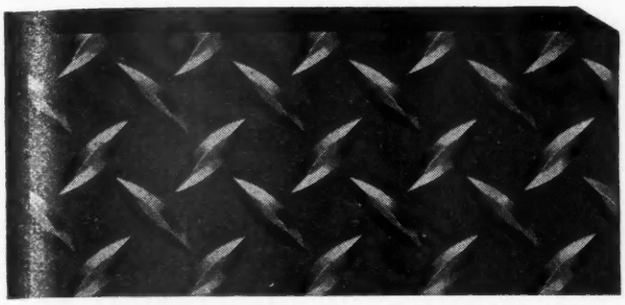

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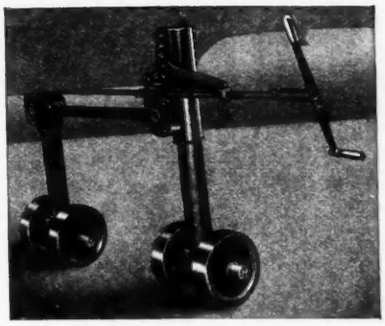

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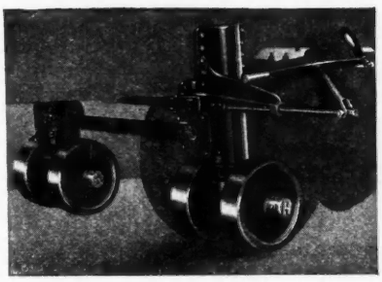

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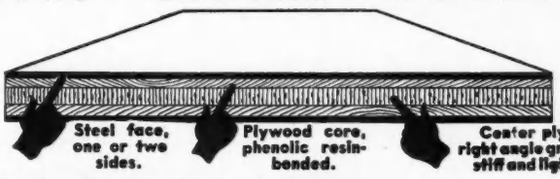

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(CONTINUED FROM PAGE 78)
of new four-ply passenger car tires, and 30 per cent of the cost of new truck tires.

The afternoon session developed a fleet criticism and a fleet defense of vehicle design. It is treated separately in this issue on page 26, under the heading "Design versus Maintenance."

Three excellent papers composed the symposium on engine wear at the morning session of the second day. They were presented by Mr. Faulkner, of Armour & Co., W. J. Cumming, of Surface Transportation Corp., New York City, and G. W. Laurie, Atlantic Refining Co., Philadelphia, Pa.

"Lubrication, without question, is the most important single factor in connection with engine wear," Mr. Faulkner declared. "Very definite improvements have been made in lubricating oils, which both the manufacturer and operator are taking advantage of to reduce wear. Yet we find a great deal of confusion existing in the minds of many as to the type of oil to use and the length of time to use it between drains.

"In a large fleet maintenance expense will amount to 12 per cent or 14 per cent of total operating costs, whereas oil and grease expense will seldom be in excess of 3 per cent. Therefore, is it logical to take unnecessary chances to reduce the smaller item which may have an adverse effect on the maintenance item?

"I do not believe the subject of oil draining and its effect on wear can be generalized. To set an arbitrary drain period without knowledge of the operation is ridiculous. A refiner that advertises his oil can be used a certain number of miles in service is subject to the same criticism as an engine manufacturer that puts a mile period on the drain, as both are shooting at oil costs and neither is assuming any responsibility for engine wear.

"To obtain the longest engine life between reconditioning periods, break in with a good quality light oil, and continue to operate on this viscosity oil until consumption becomes too great. Then step up one oil number and continue to operate until consumption becomes excessive, at which time re-ring or make necessary mechanical corrections to lower consumption. I feel that when you have accumulated in the crankcase oil a total by volume of 1 per cent naphtha insoluble material, it is time to drain."

Mr. Cumming also contended that good lubrication was the most important factor in the wear problem.

"Diesel engines, of which we operate over 100, are even more critical of lubricating oils than the gasoline engine," he declared. "No diesel lubricant should be selected by specification, but should be chosen after actual operating experiences. Viscosity of diesel lubricating oils is probably the most important characteristic and under operating conditions it should remain fairly constant if trouble is to be avoided. Since temperatures within the engine crankcase often range from less than 120 deg. to well over 200 deg. Fahr., it becomes apparent some means should be provided to keep oil temperatures more constant. In my opinion, all automotive diesel engines should be provided with oil cooling radiators.

"The tendency to form carbon is the next most important function of the oil to be selected. In our specification for Conradson Carbon we limit the carbon to a maximum of 0.35 per cent. A good safe pour point to specify is Zero.

"The lubricant, of course, should be well filtered, preferably in two stages, cleanable and disposable types, and the air to the engine should be filtered to the point that it is free of dirt and dust at all times.

"According to our experience, diesel engine cylinder wear should be approximately that of gasoline engines in the same service and under the same conditions."

Mr. Laurie in his paper gave the results of a study which showed that valve spring pressures play a very important part in engine valve failures. His paper is treated separately in this issue, page 22, under the heading "Valve Spring Tension Rates Attention."

In written discussion of Mr. Faulkner's paper, S. B. Shaw, of Pacific Gas & Electric Co., San Francisco, said that, in his opinion—an opinion based on general observations and investigations of operations in California—"design contributes principally to engine wear, that is, wear of cylinders, rings, pistons, engine bearings, timing system, etc."

"The chief element of design which affects cylinder wear is temperature control," he said. "Low operating temperatures cause excessive wear in more cases than do high temperatures.

"Another element of design that influences wear is top compression ring width. As a result of our observations we have been installing wider compression rings, 3/16 in. where possible, in our engines. The effectiveness of the wider rings is greatest where average engine temperatures are lowest."

The afternoon session on speed gear-changes was devoted to a paper on two-speed axles by J. R. Bartholomew, of Eaton Mfg. Co., and another paper on multi-speed transmissions by C. D. Peterson, of Spicer Mfg. Co. Both papers dealt largely with mechanical details and failed to justify the hope that they would represent an engineering analysis evaluating the advantages of one over the other.

As L. W. Fischer, of the Timken-Detroit Axle Co., pertinently inquired in his written comments, "Since the range of overall gear reduction should be approximately the same and the overall efficiency should be equal, what governs the choice?"

As to two-speed axles in capacities greater than 20,000 lb. gross vehicle weight, he said there is some question from an engineering standpoint as to whether this should be the jumping-off place between two-speed axles and compounded transmissions or the use of seven or eight-speed single transmissions." What about the 300 to 400 lb. of increased unsprung axle weight?" he asked.

The questions went unanswered.

At the transportation dinner Howard Ketcham, color engineer and consultant of E. I. du Pont de Nemours & Co., gave an interesting and instructive talk on the selection of color as related to truck and bus body design. He declared that color as applied to trucks is just as much a factor in highway safety as in reflecting a type of business.

The meeting wound up with a conference of utility fleet supervisors under the chairmanship of J. R. North, of Commonwealth & Southern Corp., Jackson, Mich. The supervisors discussed subjects pertinent to utility fleet operations. All discussions were "off the record."

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LOAD

(CONTINUED FROM PAGE 32)

a rundown battery condition by setting the generator output above its specified maximum. This will cause rapid brush and commutator wear and will probably burn out the generator.

Defective wiring and poor connections are sometimes responsible for a discharged battery. These must be checked for, if a low battery condition on a particular job becomes chronic. Also, the suitability of the generator and regulator for the application should be considered. The selection of the generator for any particular application must be made on the basis of maximum current needed and the average operating speed, among other factors. This matter was thoroughly analyzed on these pages in August, 1938, by Mr. R. M. Critchfield, Sometimes a mere caution to the driver to exercise care in the use of the electrical accessories will aid in relieving rundown battery trouble.

When the battery seems to require an excessive amount of water, it would be well to check the generator output and regulator settings, since this is often an indication of battery overcharging. In addition to high regulator or generator settings, poor wiring or connections may also cause battery overcharge.

Once every three months, disconnect and clean all battery cable connections. The clips and terminals should be cleaned to bright metal and reconnected. At this time the battery top should be cleaned. Tighten the plugs, sprinkle water over the battery top, then a small amount of soda. Wait until foaming stops, and flush off with clean water. Coat the terminals and cable clips with a light coat of corrosion resisting compound to reduce the effect of corrosion. Inspect the cables carefully. If frayed, worn, broken or loose in the terminal connectors, replace. Always use cable at least as large as the original for replacement.

Once every six months, remove and clean the battery. Clean the battery compartment with a wire brush, then paint it with acid-proof paint.

Generator Inspection

The generator should be lubricated

(TURN TO PAGE 84. PLEASE)

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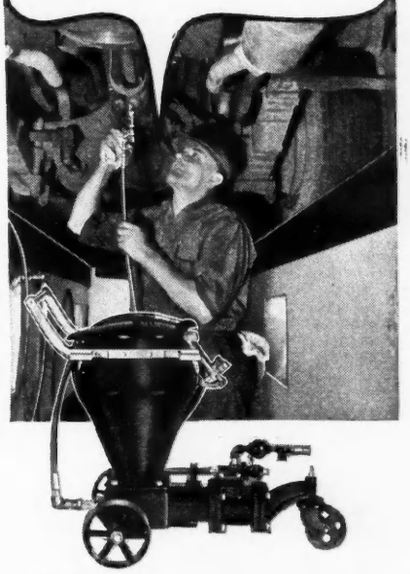

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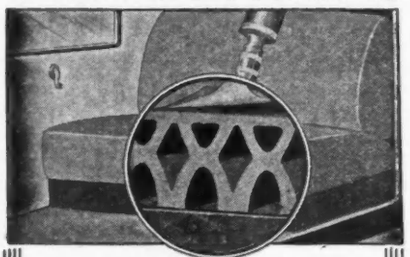

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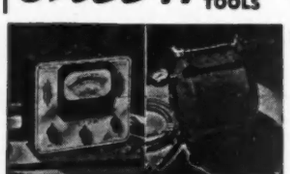

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(CONTINUED FROM PAGE 83)

once a week. Grease cups should be turned down one turn; filled with medium cup grease if needed. Hinge cap oilers should be supplied with 8-10 drops of light engine oil. Check the terminal lead connections to be sure they have not become loosened. Considerable trouble can result, especially on the higher output generators, if loose connections develop in the charging circuit. Check the drive belt and tighten or replace as necessary. Check the mounting for looseness — this is particularly important on applications where vibration is experienced.

Once each month, remove the coverband and inspect for thrown solder. Solder thrown from the commutator riser bars indicates that the generator has been producing an excessive output. The output and the regulator settings must be checked and adjusted, if necessary.

Inspect the commutator and brushes for wear. Replace brushes as necessary. New brushes may be seated by use of a brush seating stone. If the commutator is dirty it can be cleaned with a brush seating stone or a strip of No. 00 sandpaper held against it with a flat piece of wood of proper size while the unit is operated. Blow out all dust. Never use emery cloth to clean commutator, particles of emery may embed and cause rapid brush wear. If the commutator is worn or rough, remove the generator from the engine so the armature may be disassembled, put in a lathe, and the commutator turned down. Undercut the mica. Avoid leaving burrs which would cause rapid brush wear.

In addition to the above, check the brush spring tension once every three months, and also whenever new brushes are installed. The proper brush spring tension plays an important part in generator operation, although too often this detail gets little or no attention. Low brush spring tension causes poor commutation, arcing and burning of the commutator and brushes, and a reduced output. Excessive tension causes rapid brush and commutator wear.

At yearly intervals the generator should be removed from the engine, completely disassembled, and all parts thoroughly cleaned. Avoid using any cleaning method or com-

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pound on the armature or fields which would injure the insulation. Ball bearings should be repacked with a good grade of ball bearing lubricant.

All worn parts should be replaced. The commutator should be trued in a lathe and the mica undercut, if necessary. All wiring connections, upon reassembly, should be made with rosin flux. Never use acid flux on electrical connections.

This periodical rebuilding constantly renews the generator so that it can continue to perform its job, without trouble, for an indefinite time.

Regulator Inspection

The only attention the regulator will normally need at weekly intervals is a check to make sure the terminal connections are tight. It is of extreme importance to avoid loose connections which would cause high resistance in the charging circuit. This is especially true on the higher output generators.

At the same time the generator output is checked, each month, the regulator settings and the cut-out relay closing voltage should also be checked, and adjusted if necessary. Cleaning the contact points will occasionally be required. On some applications, the unit can be disassembled sufficiently to permit cleaning of each point separately. Use a fine-cut contact file. File each point separately. Avoid filing the smaller point excessively on those applications where points of two sizes are used, since on these units the smaller point is of a softer material. If the points have become pitted, use a riffler or spoon file to clean out the pits. Never use emery cloth to clean contacts, since this may leave emery embedded in the contact material.

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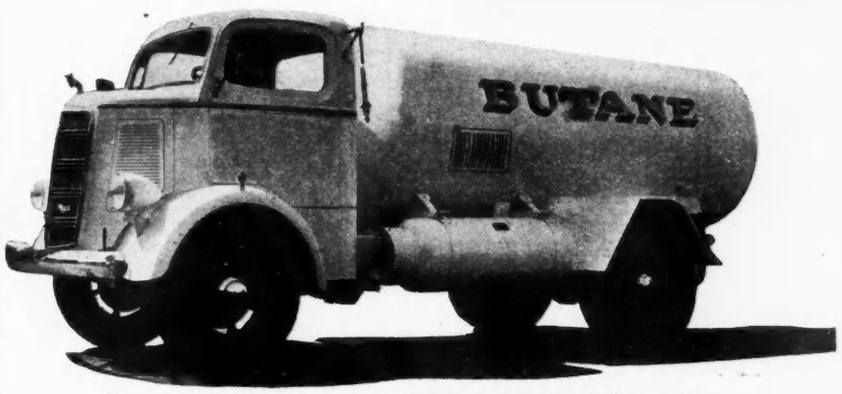

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Starting Motor Inspection

Once a week the cranking motor should be lubricated. The hinge cap oilers should have 8-10 drops of light engine oil. Grease cups should be filled with medium cup grease, if necessary, and turned down one turn. Check terminal connections on cranking motor and switch to be sure they are tight. Check the mounting bolts, and the solenoid mounting screws to make sure they are tight. This is particularly important on applications subjected to vibration. Exposed terminals, especially on the larger 12 and 24 volt units, should be taped or otherwise insulated to avoid accidental grounding. The low resistance of the larger units would permit sufficient current to flow to cause serious damage to the equipment if a ground should accidently develop.

All drivers should be cautioned to avoid using the cranking motor for more than about 30 seconds at any one time. Due to the amount of power required to crank the engine, it is necessary to take a high current through the cranking motor, and con-

(Turn to Page 86, Please)

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(CONTINUED FROM PAGE 85)

siderable heat will develop. Unless the driver exercises sensible care in the use of the cranking motor, trouble may develop. After 30 seconds of continuous use, the cranking motor should be permitted to cool off for about 2 minutes before again being used. NEVER USE FOR MORE THAN 30 SECONDS AT ANY ONE TIME.

At monthly intervals the cover bands should be removed and the brushes and commutator inspected for wear. Worn brushes should be replaced. If the commutator is dirty it may be cleaned with a strip of fine sandpaper (No. 00) held against it while the unit is operated. Blow out all dust. Never use emery cloth to clean the commutator — particles of emery may embed and cause rapid brush wear. If the commutator is worn or rough, disassemble the armature so it may be put in a lathe and a cut taken off the commutator. Undercut the mica. Avoid leaving burrs which would cause rapid brush wear.

If solder has been thrown from the commutator riser bars, the indication is that the cranking motor has been used for excessively long periods, due perhaps to some cause which prevents the engine from starting normally. Failure of the cranking motor will result if it is used for too long a period at any one time, without pauses to permit it to cool off.

At intervals of six months, the cranking motor should be removed from the engine and the drive (Bendix or Dyer) cleaned with kerosene. Do not use any compound on the overrunning clutch type drives which would tend to dissolve the lubricant from the clutch. Cleaning of the drive may be required more often where the unit operates in exceptionally

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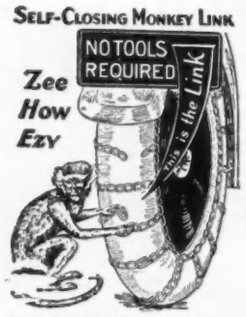

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dusty applications. After cleaning the drives, use a small amount of very light oil to lubricate the splines and bearing surfaces of the drive. Avoid overoiling, since this will cause the drive to become gummy and prevent proper operation. Oilless bushings should be supplied with a few drops of light engine oil. Lubricate other bearings as previously recommended. On units with grease reservoirs, repack the reservoir with medium grease.

At intervals of approximately once a year, the cranking motor should be completely disassembled, all parts thoroughly cleaned, worn parts replaced, and the unit reassembled. Avoid cleaning methods or compounds which would injure the insulation of the armature and fields. If necessary, the commutator should be turned down in a lathe and the mica undercut. All wiring connections should be resoldered with rosin flux — never use acid flux on electrical connections. Lubricate as previously outlined.

Starter Switch Inspection

If the application uses a solenoid, it should be checked at the time the cranking motor is overhauled. New contacts may be required, or cleaning of the original contacts. Exposed terminals, especially on the larger 12 and 24 volt units, should be taped to avoid grounding. The low resistance found in the larger units would permit sufficient current to flow to destroy the units, should accidental grounding occur.

At intervals of approximately six months, the wiring harness and leads should be checked for chafing, wear, frayed insulation and broken strands. The connections at all switches and instruments should be carefully checked. After a period of time, due to vibration, heat, oil and other causes, wiring does wear out, connections, both soldered and mechanical, will loosen. These conditions should be located and corrected, before they have progressed so far that a high resistance is set-up in some circuit, which would cause serious damage to some part of the equipment.

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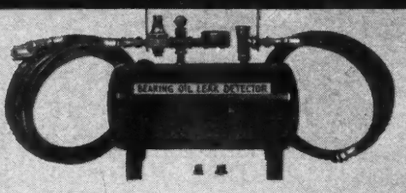

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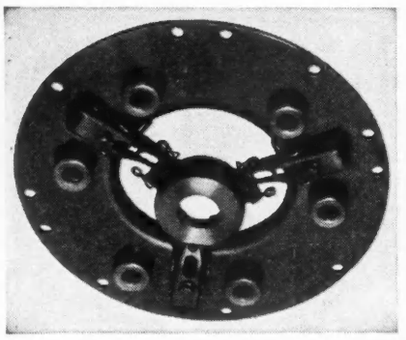
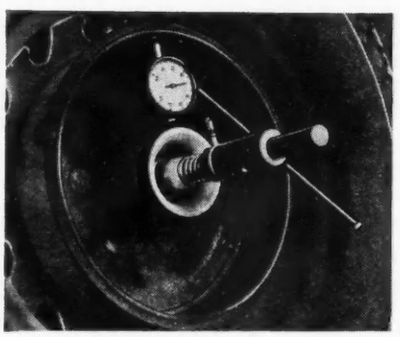


Chicago. The new clutch, BW-2937, is easily installed. An important feature is the fact that the pressure springs are insulated from pressure plate heat, and are seated in ventilated cups for longer life. The pressure plate itself is alloy cast iron of high tensile strength.

New Offerings by Barrett

A brake drum dial gage, so sensitive and accurate that it is said to detect in .001 parts of an inch, has been placed on the market by Barrett Equipment Co., St. Louis, Mo. The new device, in addition to measuring eccentricity and wear of a brake drum, may also be used in checking front spindles, bell housings, flywheels and many other operations requiring accuracy of adjustment.

Another addition to the Barrett line is a



universal floating V-block attachment, adaptable to any model Barrett Brake Doktor now in use. With this new attachment, Brake Doktors can handle the grinding operations on the brake linings of all sizes of heavy-duty trucks and buses. It handles all spindles and rear axles, straight or tapered, from ¾ in. to 4½ in. in diameter.

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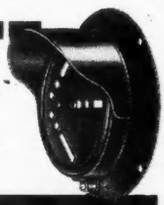
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NEWSCAST

(CONTINUED FROM PAGE 46)

Fruehauf Trailer Co. reports an order of 200 trailers (100 of them to be refrigerated) from J. L. Keeshin. All are of the new high-tensile steel construction. They will be used in Keeshin and Seaboard operations.

Important reductions in consumer list prices have been announced by Goodyear Tire & Rubber Co. Typical of the new price status is a reduction of 12 per cent on the G-100 line, bringing price of 6.00/16 from $15.95 to $13.95. The new pricing is expected to stabilize consumer deals.

Bowers Battery Mfg. Co., Inc., Reading, Pa., has entered the spark plug field with a complete new line of automotive types. A recently completed plant addition at Reading provides the necessary production space.

From B. F. Goodrich Co., Akron, comes word of some interesting new catalogs. One deals with the company's acid-resisting paint line known as "Acidseal." Two others deal respectively with truck and bus and diesel batteries.

Paul F. Jones, who comes to the battery sales dept. of Goodyear Tire & Rubber Co. from the Chicago district of Willard Storage Battery Co.

The Hoist & Body Division of Gar Wood Industries has appointed the following new distributors: Robert P. Stapp, Birmingham, Ala.; Lundberg Equipment Co., Logan, Utah; Cate Equipment Co., Salt Lake City; and Wilson Equipment & Supply Co., Cheyenne, Wyo. M. P. Arnold is new Buffalo branch representative.

Underwriters' Laboratories approval for its Grigsby collision switch has been obtained by Elsbert Mfg. Co., Chicago. The device is designed to open the ignition circuit in case of sudden impact from any direction.

Brace Process Corp. is the new name of the old Clean Oils Corp., makers of Filtermaster oil conditioners. The address is 261 Fifth Ave., New York.

Prices of new Bantam commercial cars for 1940 have been announced as follows: Pick-up truck, $475; Panel truck, $489, and Station wagon, $565.

Carl H. Henry (left) and Ray A. Cooper, recently named as Southeastern and Midwestern managers, respectively, of Wilkening Mfg. Co. Mr. Henry's headquarters are in Atlanta, Ga.; Mr. Cooper in Chicago

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